SEP 9, 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. SEPTEMBER 8, 1898. CHICAGO, ILL. NUMBER 36

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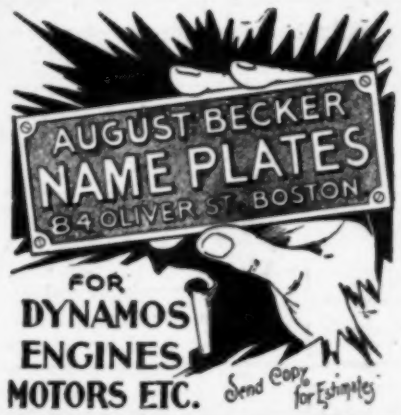

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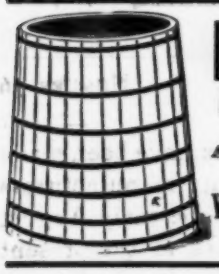

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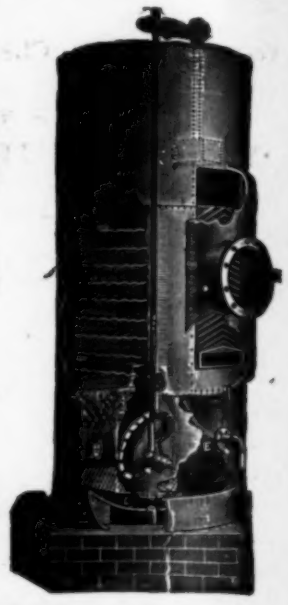

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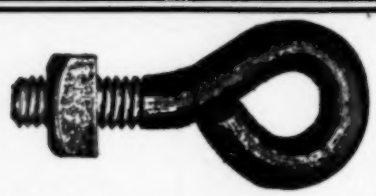

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. SEPTEMBER 8, 1898. CHICAGO, ILL. NUMBER 36

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

With no sign of excitement or of speculative fever, the iron market is gathering strength. In some departments the past week has been one of lighter buying than several that preceded, but the knowledge of large business soon to be placed and the heavy engagements now on the books of producers makes the situation inherently strong. Steel works will have difficulty in delivering more material in intermediate forms than they have already engaged to turn out in the present year, and thus a comparatively small amount will bring the prices now being asked. The conservatism of the advances that are made in finished material is due to the moderate appreciation in Bessemer pig iron; if the immediate condition of the steel market governed, finished lines would be higher. But, as usual, demand rather than cost of materials is the decisive element Pig iron markets have been quiet through the week, after the considerable buying of August, which with some furnaces was one of the best months of the year. There is no uniformity in the advances in foundry irons. Northern furnaces have made less change in their prices than some Southern producers, but there is substantial unanimity in the report of decreasing stocks and heavy orders ahead. It is believed that if the expected fall business comes out, much of it will be done at the new prices, which range from 25 to 50 cents above those of mid-summer. September will add several to the list of active furnaces, foundry iron as well as Bessemer sharing in the increased production, which appears to be only proportioned to the increased consumption. Foundrymen are already well supplied with contracts for fall and winter months, and much more work is now being figured on. Pipe works report an improvement in demand which has been uncomfortably light for some months. An Eastern Pennsylvania pipe contract placed the past week will require 20,000 tons of pig iron. Car wheel foundries are quite well supplied with business and have been buyers of charcoal irons recently. Lake Superior charcoal furnaces have made good sales, and have considerably reduced their stocks, while prices are firmer. In Bessemer pig iron there has been a quiet week. Production is increasing somewhat, the restriction programme of the furnacemen having been practically completed. The September meeting of producers, soon to be held, will have an important bearing on the market for the balance of the year. The feeling is that if any further advance in Bessemer iron should take place it would be in response to demand and not through concerted action. The oversold condition of Central Western steel plants appears in the fact that some of them have gone into the market for billets to meet contract deliveries. Considerable purchases of tin plate bars have been made for the first half of 1899. Tin plate manufacturers are getting a small advance over the early August basis, and the prospect of success in the present effort at combination has doubtless inspired considerable of the buying, both by consumers and dealers. Progress has been made in perfecting the Federal Steel Co.'s plans, and it is believed it will be operative within a few weeks. It is reported from Pittsburg that export inquiries are lessening under the higher quotations now made for steel and steel products. There is some offset to this advance, however, in the upward movement, both in pig iron and in some finished lines, in British and Continental markets.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, Sept. 7.

The quietness of the past week has been taken in some quarters as a sign of weakness, but so far no break of any kind has come, nor is there prospect of any. Foreign buyers have withdrawn from the field for the present, being influenced by continued high prices. The contract for the armor plate for the three battle ships for which bids were opened last week, has been awarded to the local company.

PIG IRON.—The Bessemer furnacemen are holding their quotation of $10 without any trouble, and if any further advance comes it will probably be caused by the market rather than by any arbitrary action on the part of producers. The demand has been quiet for the last week. Foundry irons are showing some activity. No. 2 being still quoted at from $10.10 to $10.25. Sales are numerous but rarely more than carload and 50-ton lots. Gray forge is about where it was last week, from $9.35 to $9.45. A sale of 1,500 tons at the latter price is reported and the quotations of $9.50 was made on pending business. We quote as follows:

Bessemer, valley furnace	$	10.00
Bessemer, Pittsburg		10.65
No. 1 Foundry	10.50 to	10.65
No. 2 Foundry	10.10 to	10.25
No. 3 Foundry	9.65 to	9.85
Gray Forge, valley furnace	9.00 to	9.10
Gray Forge, Pittsburg	9.35 to	9.45

BILLETS.—The belief expressed a short time back that some of the local mills were oversold has been verified by one of them purchasing 8,000 tons to help out in September deliveries. It is understood that some other mills here and in the valley have been compelled to come into the market as buyers to fill their orders. Billets are strong at $16.25 maker's mill, with some sales varying in size from 100 to 500 tons having been made at $16.50 maker's mill for immediate delivery. Sheet and tin plate bars are in good demand. A sale of 5,000 tons of the former at $18.25 delivered, being made recently. The general market is probably from $17.75 to $18.25, as sales have been made at both these figures recently. Rods are scarce with continued demand. The foreign inquiries have dropped off probably owing to continued quotations at $22.

IRON AND STEEL SKELP.—The volume of business continues good, the mills being very busy. Prices are unchanged from last week and are as follows. Grooved iron skelp, 1.10c to 1.12½c; sheared iron skelp, 1.17½c to 1.20c; grooved steel skelp, 1.02½c to 1.05c; sheared steel skelp, 1.10c to 1.12½c.

PIPES AND TUBES.—The continued good demand for pipes and tubes has resulted in a change in base discounts. This went into effect the latter part of last week. The base discounts are now as follows: Butt weld, black 55 per cent off; lap weld, black 65 per cent off; butt weld, galvanized, 47½ per cent off; lap weld, galvanized, 52½ per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller 72½ per cent off; 2½-inch and larger, 75 per cent off. Inserted joint casing is now quoted at 60 off and screw and

socket joint casing at 60 and 10 per cent off. The additional discounts are unchanged, being six tens for less than carload, and six tens and 2½ for carload lots.

SPIEGEL.—The market is quiet and quotations are $23.50 to $24.

SHEETS.—The advance of last week does not appear to have frightened would-be buyers. With one or two exceptions the mills are reported in good shape. The quotation of 2c is being maintained without difficulty on No. 28. Galvanized sheets are quoted from 80 and 5 per cent to 80 and 7½ per cent off list with freight allowance varying from 15 to 18 cents.

STRUCTURAL MATERIAL.—The contract for the Woodville Home for the Insane, which calls for about 500 tons of material has been awarded to a local firm. This is about the maximum of the orders received but the aggregate tonnage continues good. Prices are as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c and angles 1.10c. Universal plates alone at 1.15c; with other shapes 1.05c.

FERRO-MANGANESE.—The market is quiet. The quotation is $50 for 80 per cent domestic delivered.

RAILS AND TRACK MATERIAL.—The good demand and the scarcity in light rails continue. The mills are still endeavoring to catch up but their attempts are productive of no appreciable change in the present condition. Sixteen-pound rails are quoted at from $19 to $19 50, with heavy sections steady at $18. The season for demand for links and pins is here and these articles are in better demand than heretofore. The quotation is 1.20c. Other materials are quoted as follows: Iron track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; spikes, 1.40c to 1.45c.

PLATES.—The week has been uneventful. The Coolgardie, Australia, order will likely not be heard from until about Nov. 1, as the bids must all go to Australia for consideration. General buying is good with the railroads still important factors in the market. Prices are firm as follows: Tank, 1.15c; shell, 1.20c; flange, 1.25c; fire-box, 2c and upwards.

SPELTER.—Spelter has advanced again. As the foreign market is higher also, more stability is looked for in this advance. It is now quoted at $4.85 to $4.90.

OLD MATERIAL.—The business in old material is getting better and the market correspondingly firmer. Among the week's sales are the following: 1,000 tons heavy mixed steel at $10; 1,000 tons steel rails at $10.10; 2,000 tons iron rails at $13.75; 1,200 tons heavy steel scrap, $10.50. Other materials are as follows: Cast borings, $6; railroad cast scrap, $9, gross; No. 1 wrought scrap, $11.50 net; iron axles, $6, net; steel axles, $12.50, gross; car wheels, gross, $10.50; charcoal scrap, $10 gross; billet and bloom ends, run of mill, $11; busheling scrap, $9 50 net; machinery scrap, $9, gross; wrought turnings, $6.75, net, valley.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, Sept. 7.

The steel market continues very active, and good sales of nearly all grades of steel were made last week. The demand is very heavy—so much so that many of the mills are unable to take care of all the business offered. It comes from all kinds of consumers, and gives every indication of not only keeping up, but of growing larger as time passes. The sales of pig iron have not been large, but there is somewhat of an increase in the demand, and furnaces are looking for a good business for this month.

PIG IRON.—The largest sale made last week was one of 1,500 or 2,000 tons of Southern iron to Milwaukee. No other heavy orders were placed, for either Northern or Southern iron, but the demand appears to be increasing slightly, and furnaces are looking for a good trade this month. Dealers are continually surprised with the sales they are making, as it was thought a month ago that most of the consumers—the large ones, at least—in this territory were supplied for some time ahead. There is a continual run of orders for renewals and enlargements of contracts, however, from unexpected sources, and this keeps the tonnage of sales up to the average every week. One dealer reports the month of August to have been fully as large as any month this year so far. Considering the season, this is remarkable. Agricultural implement makers are using very much larger quantities of iron than ever before, this year, and nearly every other kind of foundry is running full, and taking as much iron as it can melt. The market is firm, especially on Northern irons. Southern furnaces are said to be making some concessions on one or two grades, but most of them claim to be getting full prices for their iron in all cases. No changes have been made in quotations in the week.

Lake Sup. Charcoal	$11 50 @ 13 00	Southern Coke No. 2	$10 10
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft	10 85
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft	10 60
Local Coke Fdy. No. 3	10 75 @ 11 00	Southern Silveries	11 25 @ 11 50
Local Scotch Fdy. No. 1	11 50 @ 12 00	Jackson Co. Silveries	12 50 @ 14 50
Local Scotch Fdy. No. 2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 50
Local Scotch Fdy. No. 3	10 75 @ 11 00	Alabama Car Wheel	15 00 @ 16 00
Southern Coke No. 1	10 85	Malleable Bessemer	11 50 @ 12 00
Southern Coke No. 2	10 60	Coke Bessemer	11 50 @ 12 00

BARS.—There continues to be a good demand for both iron and steel bars, most of it in small lots, although one or two good contracts were placed last week. The mills are getting firmer in their views, and the low priced iron has entirely disappeared from the market. Common iron is uniformly quoted at 1 10c as the bottom, now, and very few mills are selling at anything under this price. Guaranteed iron is quoted at 1.15c to 1.20c, and soft steel bars from strictly billet stock at 1.10c to 1.20c.

RAILS AND TRACK SUPPLIES.—There were only a few small sales of standard sections last week, but quite a good tonnage of light rails was placed. The demand for heavy sections seems likely to be larger for next year than ever before. Considerable figuring is being done at present by the railroads for their next year's requirements, and orders are expected to be placed within a short time. The market is very firm, and there is talk of higher prices on rails within a short time. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—There is a heavy demand for both billets and rods, but the local mills are so full of orders they are not anxious for business, and sales are consequently small. Orders for about 3,000 tons of billets for delivery the early part of 1898 were placed last week, at $16.50, Chicago. It is not likely that further business would be taken at less than $17. Rods are selling at $22.50 to $23.

CAR ORDERS.—While no large contracts were placed last week, the small order business keeps the market for car material active, and considerable orders for material are being placed all the time. The mills making axle billets are overrun with orders, and they are very hard to get for early delivery.

PLATES.—The demand continues large, and several good sized contracts were placed last week. An order for 3,500 tons of ship plates is in the market, contingent upon the placing of the contract for vessels, which now seems likely to occur soon. The market is very firm, but no advances have been made in the week. The mills are all full of orders, and are not pushing for business. In fact, some mills have withdrawn quotations with the expectation of higher prices within a short time. Quotations are made as follows: Tank plates, 1.20c to 1.30c; flange steel, 1.30c to 1.40c; fire-box steel, 1.85c to 5c.

STRUCTURAL MATERIAL.—General business continues excellent. The tonnage closed last week in small orders was fully up to the average, and everything points to a continuance of the business. The only large contract placed in this market was that for the steel for the Ayers building, amounting to 1,200 tons, which went to Pittsburg. Quotations are very firm, and are unchanged: Beams, 15 inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates, 1.20c to 1.30c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

SHEETS.—Both black and galvanized sheets are in good demand, and the mills have some difficulty in keeping shipments up to their orders. One or two good contracts were closed last week, and the small order business, both from mill and from store, was excellent. Black sheets are now quoted at 2.05c to 2.15c, and galvanized at 80 and 5 per cent discount, with freight allowances.

MERCHANT STEEL.—Mills are still not anxious to accept business at present rates, and are holding customers off as much as possible. The demand is large, and good orders could be

placed if the mills would accept them. Quotations for immediate acceptance are as follows: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.70c; smooth finished tire, 1.50c to 1 60c; tool steel, 5 50c to 7.50c; specials, 11c and upwards.

SCRAP.—There is some demand for some grades of scrap, but not much business is being done. Dealers are expecting a larger demand shortly, and are inclined to the opinion the market will be higher, although no advances have been made as yet. Dealer's selling prices are as follows:

Old iron rails, gross,	$12 50@$12 75	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 25@ 4 50
Old steel rails, short	8 75@ 9 00	Wrought turnings, net	6 00@ 6 50
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 00@ 7 25
Railroad forge, net	11 50@ 12 00	Mixed steel, gross	7 25@ 7 50
Dealer's forge, net	10 00@ 10 50	Stove plates, net	5 75@ 6 00
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	12 75@ 13 00
Malleable cast, net	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., Sept. 7.

The week has had its quota of ore sales in Bessemer and non-Bessemer grades. The movement of ore up to Sept. 1 was equal to a month's shipments in advance of 1897, or 2,200,000 to 2,300,000 tons. To Sept. 1, 1897, the total was 7,712,000 tons. Figures for last month from all ports but one, and that estimated on the basis of its shipments in August last year, give a total to Sept. 1 of 9,042,926 tons. A season's total of 14,500,000 tons is indicated. The shipments from the Vermilion range were at a less rate in August than in the early portion of the season, owing to the inadequate supply of miners. The season has developed some disappointments in connection with operations at certain Mesabi properties. Irregularity in these deposits is a feature that must be reckoned with; in the case of some mines calculations as to quantity and quality will need to be revised.

PIG IRON.—A quiet market for Bessemer iron has followed the buying of one and two weeks ago, but it is expected that requirements for the first half of 1899 will soon be provided for in part. The talk of a possible advance to $10.50 at furnace seems not to have been taken seriously. There are yet considerable yard stocks to be taken up, and production is considerably increased by the September furnace resumptions. Further selling of foundry iron is reported—in some instances at 25 cents above prices recently available. Forge iron is unchanged at $9 to $9.10, valley furnace. Lake Superior charcoal is more active. Prices are better than those of a few months ago and the demand is large. Some grades, notably the higher ones, are scarce and furnace stocks are very nearly wiped out. The leading Michigan interest has recently closed sales for 12,000 to 15,000 tons, principally to car concerns.

Bessemer	$10 65	Valley Scotch No. 1	$10 65
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 15@10 25	Gray Forge	9 50
No. 3 Foundry	9 65@ 9 90	Lake Superior Charcoal	11 50

BILLETS, SLABS AND RODS.—We continue the quotation of $16.25 to $16.50, Cleveland, on steel billets. In the past week a considerable portion of the 20,000 tons of tin plate bars that have been figured on locally for Ohio plants was closed, delivery in the first half of 1899. We quote $17.50 to $17.75, Cleveland, on 1899 deliveries and $18.25 to $18.50 on early shipment. Mills have diverse ideas about prices on next year's business, but in general quotations are made on the basis of current steel contracts plus the advance in Bessemer pig iron, and not on the prices which have resulted from the present scarcity of steel. We note local sales of 6,000 tons of slabs and 3,000 tons of ingots. In wire rods there is little movement in view of the well sold condition of mills for the balance of the year. The quotation remains at $21.50 to $22.

FINISHED MATERIAL.—Sales of 1,500 tons of bridge material to a Northern Ohio works and of 1,000 tons of steel for a local building are reported for the week. In bars the good demand is maintained, with valley mills more generally holding for close to 1c for iron at mill. On steel bars the Cleveland basis is 1c to 1.02½c, with Pittsburg mills quite generally quoting 95c at mill. Plates continue firm at 1.15c, Pittsburg, though some business has been done at 1.17½, f. o. b. Cleveland. In sheets the advance in price has not interrupted buying. We quote 2.10c, Cleveland, on No. 27 from jobbers' stocks and 2.15c for No. 28. There is no change in wire and nails. Wrought pipe is from five to seven and a half per cent higher, though a change in base discounts. The local strike continues, but stocks are ample. Sales are at $1.15 for smooth wire and $1.30 for wire nails.

OLD MATERIAL.—The market continues fairly active, particularly in rails and heavy melting steel. We quote old iron rails at $13.50 to $13.75 valley; old steel rails at $10.25; No. 1 wrought scrap at $11.50; old car wheels, $11; wrought turnings, $6.75 to $7; busheling scrap, $9.50; heavy mixed steel, $10.25.

CINCINNATI.

Sept. 6.

The market has strengthened quite decidedly, but there are no further advances in Southern irons. The tonnage of orders placed has been considerable, especially for export. A number of unexpected inquiries have appeared from large buyers, who were supposed to have covered all their requirements for the next six months. If these negotiations are completed and contracts secured for Southern furnaces, it would not be surprising if the producers felt justified in making a moderate advance, at least on the grades most in demand. Much trouble has been experienced in getting forward iron rapidly enough to keep foundries in operation, and it is evident that buyers are carrying very light stocks in their yards. No speculative spirit has been exhibited during August, but a heavy amount of business has been transacted in a quiet way. The outlook is hopeful. In Ohio, strong irons, made principally from Lake Superior ores, there is greater competition than usual, because of several furnaces changing their product to foundry grades. This fact is holding the market down, and there seems to be greater anxiety to sell Ohio brands than Southern, in the Central district. The Lake Superior charcoal situation is very firm. It has been customary to carry quite large stocks at lake ports during the winter, but the prospects now are that furnaces will not be able to do this in any marked degree. The demand for this class of iron is brisk. Inquiry among foundries and rolling mills shows that with few exceptions the works are well occupied and have sufficient orders booked ahead to make them feel very comfortable. An effort is being made to advance gradually prices of castings a little, in order to make up the extra cost caused by the advances in pig iron and labor. We quote for cash f. o. b. Cincinnati: Southern coke No. 1 foundry, $10; No. 2, $9.75; No. 3, $9.25; No. 4 and gray forge, $8.75; mottled, $8.75; No. 1 soft, $10; No. 2, soft, $9.75; Tennessee charcoal, No. 1, $12.50 to $13; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Jackson Co., silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

FRANK L. CROBAUGH, analytical chemist and assayer, Superior and South Water sts., Cleveland, has had foundry work as one of his specialties, and has studied particularly the correction of faulty foundry mixtures and the selection of irons adapted to certain lines of castings. He has served a number of foundries in these lines, taking the work of such plants by contract. In iron ore and furnace lines, he has established a reputation as an accurate chemist and sampler, his experience including about a year as assistant to J. H. Cremer, Cleveland, and five years' service as chemist to the Stewart Iron Co., Ltd. Following this he located in Cleveland, where he has been engaged in general analytical and consultation business for the past four years. During this time he has held the chair of chemistry in the Cleveland Homeopathic Medical College, giving instruction for a few hours of each week. In view of the work coming up in that direction, Mr. Crobaugh will add to his equipment a complete assay outfit and will be ready for work in that line in a few weeks.

CAPT. JOHN SHERIDAN, manager of the Mt. Savage Fire Brick Works, accompanied by C. B. Stowe, of the Stowe-Fuller Co., Cleveland, and V. L. P. Shriver, of Pittsburg, sales agents for the Union Mining Co., spent last week in the South. At Birmingham, Ala., they closed a contract for the high grade fire brick for the new basic open-hearth plant of the Alabama Steel & Shipbuilding Co., now under way at Ensley City. This will be one of the largest and most modern open-hearth plants in the country. All of the No. 1 fire brick used in the furnaces will be Mt. Savage brick. The amount used is estimated at 1,000,000 to be delivered through the fall and winter. The Mt. Savage works made and shipped in July 1,500,000 No. 1 brick, said to be the largest amount ever produced and sold by one plant in one month.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

SEPTEMBER 8, 1898.

PATENT LAWS' DELAYS.

The committee on "Patents and Patent Laws," of the National Association of Manufacturers made a report of progress at the New York meeting of the association last January and is still at work. The committee has been collecting the views of the manufacturers of the country on needed reforms in patent laws, and many valuable suggestions have come in response to the effort in this direction. One of the prime reforms that has been advocated is the establishment of separate courts for adjudication of patents, trade marks, copyrights, etc. In lieu of this, there is a demand for such changes in present procedure as will shorten the time necessary to litigate. Reference to the status of this work is prompted by a letter we have just received from an inventor whose device is in general use in an important metallurgical line, but who has been compelled by the manufacture of palpable infringements by a former employe, to have recourse to the courts. His comment recalls Edison's definition of a patent as a Government permit to defend a lawsuit:

> I am now experiencing the common fate of inventors—that the more valuable the invention the less the security. And yet I am unable to propound any better law or practice. Perhaps a court of patent experts could be formed who would, on a prima facie investigation order infringers of a patent to put up security for damages, until a court decides.

It may be argued that the carrying out of this suggestion would also involve hardship and injustice. But it is to be considered that the present system time and again has worked serious injury to real discoverers and inventors and often enabled those who have stolen their brains to make and put away large profits before the slow-moving patent courts could make its righteous declaration. The weary wait for his due has tired out many a worthy inventor: and the business sense of the manufacturing world is now exerting itself to provide some means by which the frailties of the law shall not operate so generally to the detriment of the honest and to the help of the unworthy.

As one of the six departments of the investigation now being carried on by the National Association of Manufacturers committee, this one relating to separate courts for patent adjudications is of utmost importance. But if this be regarded as too violently revolutionary, the suggestion of our correspondent is a step toward more effectual and speedier protections. The injunction on a prima facie case is a feature of present practice, but it is charily made use of and often comes too tardily. The requirement of a bond on a hearing before experts involves less hardship to the putative infringer and gives the inventor a measure of security while he waits for justice.

THE "DIRECT PROCESS" DECISION.

The decision in United States Court on the Jones mixer patent, as reported elsewhere, is one of far-reaching importance to the steel manufacturers of the country. The common use of the direct process by Bessemer steel works, and the economies resulting from the interposition of a hot metal reservoir between the blast furnace and the converter, have made it an almost indispensable adjunct of steel making, in this day of cheap steel and close competition. If the decision just given shall be sustained in the court of last resort, it can be appreciated that enormous tribute will come to the Pittsburg company in royalties and penalties, and that by so much will its competitors be handicapped in the race for cheapest production. It may be a long time before the final adjustment of the issue, for so much is at stake that the case will be contested to the last tribunal, but meantime the effect of the decision at Pittsburg will be to put all the important Bessemer steel producers of the country, apart from the single Pittsburg interest, on the defensive. Several steel companies now have large mixers under construction, and their use is so general that a royalty on the steel produced by the direct process would be only paralleled in steel manufacture by that which was poured in upon the iventor of the Bessemer process itself.

DRYING ORES AT THE MINE.

Some experiments in drying iron ore have been conducted on a considerable scale at one of the Lake Erie docks, recently, with a view to the introduction of drying apparatus at Lake Superior mines. The ores of the Mesabi range, which have an expensive rail and lake haul, furnish an attractive field for effort in this direction, in view of the high percentage of moisture on which freight must be paid. The ores of the new range which have been mined in largest quantites contain from 10 to 13 per cent moisture. Gogebic ores, which carry the same lake freight as those from the Mesabi, are as a rule high in moisture, and offer a similar opportunity for economy through the use of the drying process. Some of the experiments made have been attended with a fuel consumption of 50 to 55 pounds of coal per ton of ore dried; and the average moisture expelled was about 10.5 per cent. There is a loss of ore in the process, and this would be especially noticeable, with the finer Mesabi ores, the hot blast used in the dryer carrying it out into the air. It is

concluded from investigations made thus far that there is a distinct economy in the procedure. It is found that after drying, the ore does not take up moisture from the air, to any appreciable extent. When it is considered that at an 80-cent rail freight, 60-cent lake freight and 98-cent rail freight from Lake Erie to Pittsburg, $2.38 a ton is paid for hauling the water of Mesabi ores from the mine to Pittsburg, the freight bill of a year on moisture alone runs up to an enormous total. The effort to save in this direction means several hundred thousand dollars on Lake Superior ores in a year, if successful.

STEALING MACHINERY DESIGNS.

There has arisen, lately, one of the periodical complaints among machinery manufacturers regarding the stealing of new designs. One manufacturer will invent an improved machine, and if it becomes popular, immediately certain competitors will put on the market machines as nearly as possible like the original, if the original is patented. In some extreme cases the imitators have even used parts of original machines for patterns to get castings from, and have made exact copies of the machines (as nearly as the shrinkage of the cooling metal in the mold would let them), when the machines were not patented.

For that matter, the imitators do not pay much attention to the obstacle of patents, when the original concern is known to be small or not financially able to fight the case in the courts. And I have often thought that the matter would sooner be justly settled if there were no such things as patents, because a patent, looking at it one way, is a sort of challenge to "make this thing if you dare." But this is another subject.

The question is: What are you going to do about it? Perhaps if I were not myself a victim of these "pirates" (as they are familiarly called in the trade—and a good name it is, too), I would not be writing this Jeremiad, or diatribe, or whatever you choose to call it. It seems useless to appeal to the average customer, and yet I cannot see how the evil is to be remedied except through the customer. The average customer says, "I don't know or care who is the original inventor of this machine, but I do know that I can buy the other fellow's machine ten per cent below your prices." Any argument that the ten per cent goes to pay my draughtsman, or my pattern maker—classes of labor which the other fellow, from the very nature of the case, does not need to employ—does not seem to score many bull's-eyes; and the cases where this argument does prevail are where the customer himself is a victim of the pirates in his line and can look at the matter from my standpoint.

I know of two concerns of about equal size. One employs about 30 draughtsmen; the other employs six. Everybody knows this; but the six-draughtsmen concern does as good a business as the 30-draughtsmen concern. And a man has told me within a week that he is going to have the six-draughtsmen concern make for him a copy of a machine built for him by the 30-draughtsmen concern. They "blew in" their time, money and draughtsmen to get up a good machine for this man, who now deserts them for the six-draughtsmen concern because the latter can afford (of course it can) to make the second machine a few dollars cheaper than the original inventors of the machine.

Sometimes it would seem that there is some power in Nature that in the long run downs those who take what does not belong to them (including machine designs and inventions); but if there is, it is a very long lane, and many people get out of patience before coming to the turn thereof. Meantime, I cannot see any relief except in the development of a moral sense among users which will move them to eschew "pirated" articles, even if they do come a little cheaper. When will that be? Some time after I have thrown away the cheap fountain pen with which I have been writing this, and pay the real inventor of fountains pens—whoever he is—a fair price for an original pen.

And that's what is the matter all along the line.

SCRUTATOR.

THE STEEL AND ORE CONSOLIDATION.

The various committees that have been at work on details of the Minnesota Iron-Illinois Steel consolidation have made good progress in the past week, and it is expected that officers will be elected and that the Federal Steel Co. will be a working corporation by the end of the month. Some facts are available in addition to what has already appeared in these columns, as to the plan under which stock in the various companies are acquired, and the basis of exchange for stock of the Federal Steel Co.

Minnesota Iron Co. stockholders will exchange 100 shares of their stock for 135 shares of preferred and 108 of common stock in the Federal Steel Co. Illinois Steel Co. stockholders can exchange 100 shares of their stock for 100 shares of preferred and 80 shares of common in the Federal Steel Co. Elgin, Joliet and Eastern Railroad stockholders can exchange 100 shares of their stock for 87½ shares of preferred and 80 shares of common. In addition, all these stockholders pay $25 per share for Federal Steel Co. preferred stock. That is, Minnesota Iron Co. stockholders give 100 shares of their stock and $3375 for 135 shares of preferred and 108 shares of common stock in the Federal Steel Co. The cash thus paid for preferred stock will be used in purchasing a two-thirds interest in the stock of the Lorain Steel Co.

The Federal Steel Co., it is understood, will not buy the properties of the various companies that are to be merged in it, but will buy the stock of these companies. This obviates the necessity of buying out all the stockholders. The latter can sell or not, as they elect. Only a controlling interest in the stock of each company is necessary, but the Federal Steel Co. will exchange its stock on the basis stated above, for all stock in the various companies that is offered. Thus the individual companies will retain their corporate powers.

The report has gone out in the past week that negotiations were on foot for acquiring the American Steel & Wire Co. and making it part of the consolidation. Whether for the reason that the familiar consolidation method of over-capitalization was conspicuous in the organization of the big wire corporation, or because terms could not be made, need not be stated; but there is no present probability of the American Steel & Wire Co. becoming a part of the Federal Steel Co.

A CONTRACT involving 10,000 h. p. has just been taken by the Westinghouse Electric & Mfg. Co. The agreement is to transmit this enormous amount of power over a distance of 45 miles. The contract stipulates that the losses in generators, transformers, and line shall remain normal, notwithstanding the difficulties involved. The plant is for the Snoqualmie Falls Electric Power Co., of Snoqualmie Falls, Washington. The power station is to be located at Snoqualmie Falls, 45 miles from Tacoma, and 31 miles from Seattle, to which places the current is to be transmitted and then utilized by Westinghouse motors.

NEW DEVICE IN TUBE MAKING.

Ellwood Ivins, president of the Ellwood Ivins Tube Co., of Philadelphia, has invented an appliance by which tubes, as drawn through a die-plate and compressed upon a traveling mandrel, can be readily stripped from the latter when the drawing operation has been completed. In the illustrations, part of the fixed structure of an ordinary draw-bench is shown at 1 in Figs. 1 and 2, the former showing the drawing of the tube and the latter the stripping of the tube from the mandrel. Fig. 3 is an end view of the roller-head forming part of the machine. In Figs. 1 and 2, the draw-plate is shown at 2, and before the drawing operation the tube is mounted on the core or mandrel 3, which is drawn through the die-plate with the tube by means of a suitable connection with a draft-chain 4. Since this operation squeezes the tube down firmly upon the mandrel, the removal of the latter will be impossible without expansion of the tube. Means are provided, therefore, for expanding the tube immediately after it issues from the draw-plate, so that by the time the drawing operation is completed the drawn tube will be expanded its entire length.

This expansion is effected through a series of rollers 5 5 and 6 6, the latter pair being at right angles to the former and the rollers being so disposed that they will bear upon the tube at four equi-distan points. Compressing the tube at these points, they cause it to bulge between the points of contact and the hold of the mandrel is so reduced that it can be withdrawn. A supplementary draft-chain 7 is used in front of the draw-head, this chain traveling in a direction the reverse of the movement of the chain 4. Thus when the tube and its mandrel have been drawn through the die-plate and rollers, a stripper-die 9 may be applied to the draw-head, as in Fig. 2, and the rear end of the mandrel passed through and connected with the draft-chain 7, the stripper plate presenting an unbroken circular opening for the passage of the mandrel, while arresting the movement of the tube. The mandrel, when withdrawn, will occupy a position in front of the draw-head, where a new tube can be applied to it. Any handling of the drawn tube, with its mandrel is made unnecessary, since there is no need of carrying the tube from the rear to the front of the draw-head or for turning the tube and its enclosed mandrel end for end in order to permit of the withdrawal of the mandrel.

Instead of using two pairs of rollers arranged at right angles to each other as the means of expanding the tube after drawing the inventor anticipates a situation calling for but a single pair of rolls or three rolls arranged to form a triangle, or he may employ more than four rolls, if desired, or in place of the rolls a solid head having a central opening through which the tube is drawn, this opening being so shaped as to impart pressure to the tube at two or more points on its periphery, an instance of this construction being shown in Fig. 4. It is evident, also, that the invention is applicable to that class of tube-drawing machines in which the drawing or reduction of the tube is effected by means of grooved rollers instead of by a draw-plate. The term "draw-plate" as used in the claim is meant to include any means which may be employed for pressing the metal of the tube down upon the mandrel in order to effect the reduction in the size or thickness of the walls of the tube.

Fig. 1

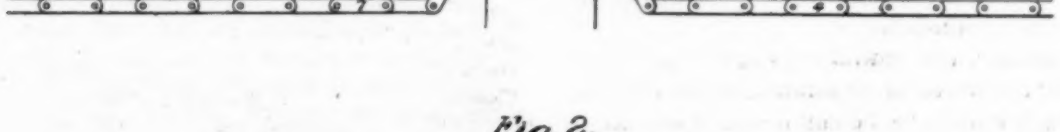


Fig. 2.

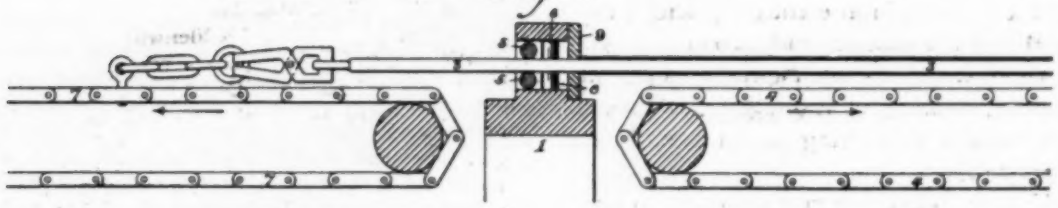


Fig. 3.

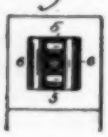
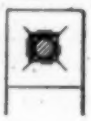


Fig. 4.



NEW DEVICE IN TUBE MAKING.

Bee-Hive and Retort Coking Ovens.

In his report on coal and coke in 1897 to the Mineral Resources Bureau of the U. S. Geological Survey, Edward W. Parker says of the development of the by-product method of coke manufacture:

"There is not going to be any revolution, nor unsettling of existing conditions by the development of the by-product system of coke making, whose progress in this country is shown in the statistics presented in these reports. It has become the habit of late to designate the prevalent method of coke making as the 'wasteful' bee-hive oven, and to criticize unfavorably the action of producers for not only failing to save the valuable contents of the coal, but also for the pollution of the atmosphere by the smoke and gases given off. It is not to be doubted that men and corporations who have millions of dollars invested in coal lands, mines and coking plants will employ such methods in their business as will make the best returns. When we speak of the bee-hive oven as a wasteful method of producing coke we must take into consideration, first, the initial cost of the plant for saving the by-products; second, the increased cost, if any, of operation and maintenance; and third, which is very important, a profitable market for the products. If our great coke producing regions were in a vicinity where the gas produced in the process could be readily and profitably disposed of for manufacturing or domestic purposes, there is no doubt that by-product plants would rapidly displace the bee-hive oven."

At the close of 1897 there were 310 by-product ovens in active operation and 195 in course of construction or contemplated. These do not include the plant at Everett, Mass., the plans for which had been laid for some time, but upon which no actual building was done until the spring of 1898. It is stated that the plant at completion will consist of 1,200 Otto-Hoffman ovens, 400 of which are in course of construction. The work is being carried on by the New England Gas & Coke Co., for the purpose of utilizing Nova Scotia coal, in which mines a large amount of American capital is invested. Contracts have already been made for the disposal, in the city of Boston, of all gas produced.

THE TIN PLATE MARKET.

There has been considerable activity in tin plates during the past week and much of the buying is of a speculative nature for deliveries extending well into next year. Consumers and dealers are alike in the market and the renewed rumors of a tin plate combination of some kind undoubtedly have brought about this condition of affairs. The actual amount of business done has not been as large as would be expected considering the number of inquiries upon the market and the quantities named in many of them. Prices for near-by deliveries are rather stronger than they were a few weeks ago as are those for far futures, the softest spot in the market being December to March inclusive. We quote f. o. b. mill Indiana district:

September to December 100-lb. cokes, ... $2 65, mill.
December to March, 100-lb. cokes. . . . . 2.60, mill.
Beyond March few sellers.

Quotations f. o. b. mlil Pittsburg district, are as follows:
September to December, 100-lb. cokes, $2.67½ to $2.70, mill.
December to March, 100 lb. cokes, . . . $2.60 to $2 62½, mill.
March to July, 100-lb. cokes, ... $2 65 to $2 67½, mill.

No definite information is given out regarding the combination, but it is understood that the plan under consideration is one offered by Judge Moore, who has successfully negotiated other deals of this kind, and that options have been given on many of the properties, including the largest and best equipped mills in the country. The general opinion seems to be that the deal will be a success, though it is impossible at this early date to say in just what form it will be finally consummated.

Personal.

Henry M. Myers, of the shovel manufacturing firm of H. M. Myers Co., Beaver Falls, Pa., died Aug. 30. Included in his estate is life insurance of $125,000.

Charles H. Foote, of the Illinois Steel Co., who has been visiting the Pacific Coast, said in San Francisco in a newspaper interview: "The great obstacle to the extensive manufacturing of steel in California is the scarcity of coal suitable for making coke. Some of the richest manganese ore I have ever seen has come from this State. In the State of Washington steel might possibly be manufactured so as to compete with the Eastern product."

William T. Shepard, for the past three and a half years secretary of the Sessions Foundry Co., of Bristol, Conn., has resigned his position to accept that of secretary of the Tonawanda Iron & Steel Co., of North Tonawanda, N. Y. George M. Eggleston, who has been connected with the Sessions Foundry Co. for a number of years has been elected secretary of that company.

Bessemer Steel Production in Great Britain.

The statistics of the production of Bessemer steel for the first half of 1898 which have been collected by the British Iron Trade Association, show that the total production of ingots in that period was 913,151 tons, against a total of 997,159 tons in the first half of 1897, 905,522 tons in the first half of 1896, and 801,860 tons in the first half of 1895 The make in the first half of 1898 was 84,008 tons less than the make for the first half of 1897, but 8,621 tons more than the make of the first half of 1896. The output of Bessemer steel rails was 436,385 tons, which represents a larger relative output than that of 1894, 1895 or 1896. The total of plates and angles is 39,809 tons; of bars, 115,565 tons; of sleepers. 35,870 tons; while 148,342 tons was marketed in the form of blooms and billets. The years of highest production of Bessemer steel in Great Britain were 1887-1890, the total being over 2,000,000 tons in each of these four years, the highest being in 1889—2,140,000 tons

THE starting up of valley furnaces recently idle has been reflected in an increase in Connellsville coke shipments. In the week ending Aug. 27 there were 13,509 active ovens, according to estimate, with a product of 138,222 tons, as against 135,883 tons in the week preceding The shipments were 7,774 cars, an increase of 320, principally in shipments to Pittsburg and points farther west.

BRITISH IRON MARKET ADVANCING.

Pig iron prices in British markets have been advancing of late, as have those of certain steel products. S. W. Royse & Co., of Manchester, Eng., writing of the market in the last week of August, say: "Affairs in the pig iron markets have been moving well during this month. Prices have advanced about 10d. per ton at Glasgow, and nearly 2s. per ton at Middlesbrough. Shipments from the latter port have been very heavy indeed, and the position at present is very satisfactory; stocks in makers' hands are only small, and buyers are covering their requirements quickly, fearing a further good advance. In the Midlands manufactured iron trade makers are well supplied with orders, and plenty of new business is coming forward, and the outlook is satisfactory."

The following table shows quotations on leading products in British markets, in the last two weeks of August, 1898, and in the last week of that month in 1897:

	Aug. 25, 1898.	Aug. 18, 1898.	Aug. 26, 1897.
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	14 0	14 0	14 3
" Cardiff	14 0	13 6	13 3
Pottery Mine, Nth. Staffordshire.	12 6	12 6	12 6
Hematite, West Coast (at mines)..	13 0	13 0	12 0
PIG IRON—			
No. 3 foundry, Middlesbrough....	42 6	42 3	40 9
Warrants, "	42 7	42 2½	40 4½
Scotch warrants, Glasgow	47 5	47 6	44 6
Hematite warrants, West Coast..	51 11	52 9	47 3½
Cold blast (foundry), Sth. Staffs...	105 0	105 0	105 0
Welsh hematite, Cardiff.....	.....	.....	52 6
MANUF'D IRON AND STEEL—	£ s. d.	£ s. d.	£ s. d.
Marked bars, Sth. Staffordshire..	7 10 0	7 10 0	7 10 0
Common bars " ..	6 5 0	6 5 0	6 5 0
Steel rails, Middlesbrough.....	4 12 6	4 12 6	4 12 6
" West Coast.....	4 12 6	4 10 0	4 8 9
" Cardiff.....	.....	.....	4 10 0
Steel angles (eng.), Middlesbrough	6 0 0	5 17 6	5 10 0
" Glasgow.....	6 0 0	5 17 6	5 10 0
Steel plates (ship), Middlesbrough	6 0 0	6 0 0	5 5
" " Glasgow.....	6 0 0	6 0 0	5 7 6
Tinplates, Bessemer L. C. cokes,	s. d.	s. d.	s. d.
South Wales.....	10 6	10 6	9 4½
COAL AND COKE—			
Best Welsh steam, Cardiff.....12s. 6d. nom.		12s. 6d. nom.	11 0
Best West Yorkshire, London...10s. "		10s. 0d. "	8 9
Coke, blast-furnace, Middlesbr'h 13s. 6d. "		13s. 6d. "	13 6
" " Cardiff.....	.....	.....	15 6

"Malleable's" Question Again.

TO THE EDITOR:

I note the comment of "Steel," on the matter referred to in my recent communication to your columns. My statement was that, allowing for the usual waste in mixing pig metal and the gates, if we had 1,500 lbs. of pig iron, 500 lbs. of gates and 250 lbs. of wrought and steel scrap, there would be nothing added to the resultant casting by the 250 lbs. of wrought and steel scrap. "Steel" quotes me as saying "250 lbs. of steel scrap" and evidently overlooked the reference to wrought iron. I note that "Steel" agrees with me that the addition of steel scrap does no good. I believe it does more harm than good, besides wasting that much material. I am familiar with the straight-draft furnace which "Steel" recommends in place of the cupola. We have one and use it now and again. I should like to hear from others among your readers, on the point referred to above. MALLEABLE.

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NEW DEVICE IN TUBE MAKING.

Ellwood Ivins, president of the Ellwood Ivins Tube Co., of Philadelphia, has invented an appliance by which tubes, as drawn through a die-plate and compressed upon a traveling mandrel, can be readily stripped from the latter when the drawing operation has been completed. In the illustrations, part of the fixed structure of an ordinary draw-bench is shown at 1 in Figs. 1 and 2, the former showing the drawing of the tube and the latter the stripping of the tube from the mandrel. Fig. 3 is an end view of the roller-head forming part of the machine. In Figs. 1 and 2, the draw-plate is shown at 2, and before the drawing operation the tube is mounted on the core or mandrel 3, which is drawn through the die-plate with the tube by means of a suitable connection with a draft-chain 4. Since this operation squeezes the tube down firmly upon the mandrel, the removal of the latter will be impossible without expansion of the tube. Means are provided, therefore, for expanding the tube immediately after it issues from the draw-plate, so that by the time the drawing operation is completed the drawn tube will be expanded its entire length.

This expansion is effected through a series of rollers 5 5 and 6 6, the latter pair being at right angles to the former and the rollers being so disposed that they will bear upon the tube at four equi-distan points. Compressing the tube at these points, they cause it to bulge between the points of contact and the hold of the mandrel is so reduced that it can be withdrawn. A supplementary draft-chain 7 is used in front of the draw-head, this chain traveling in a direction the reverse of the movement of the chain 4. Thus when the tube and its mandrel have been drawn through the die-plate and rollers, a stripper-die 9 may be applied to the draw head, as in Fig. 2, and the rear end of the mandrel passed through and connected with the draft-chain 7, the stripper plate presenting an unbroken circular opening for the passage of the mandrel, while arresting the movement of the tube. The mandrel, when withdrawn, will occupy a position in front of the draw-head, where a new tube can be applied to it. Any handling of the drawn tube, with its mandrel is made unnecessary, since there is no need of carrying the tube from the rear to the front of the draw-head or for turning the tube and its enclosed mandrel end for end in order to permit of the withdrawal of the mandrel.

Instead of using two pairs of rollers arranged at right angles to each other as the means of expanding the tube after drawing the inventor anticipates a situation calling for but a single pair of rolls or three rolls arranged to form a triangle, or he may employ more than four rolls, if desired, or in place of the rolls a solid head having a central opening through which the tube is drawn, this opening being so shaped as to impart pressure to the tube at two or more points on its periphery, an instance of this construction being shown in Fig. 4. It is evident, also, that the invention is applicable to that class of tube-drawing machines in which the drawing or reduction of the tube is effected by means of grooved rollers instead of by a draw-plate. The term "draw-plate" as used in the claim is meant to include any means which may be employed for pressing the metal of the tube down upon the mandrel in order to effect the reduction in the size or thickness of the walls of the tube.

Fig. 1

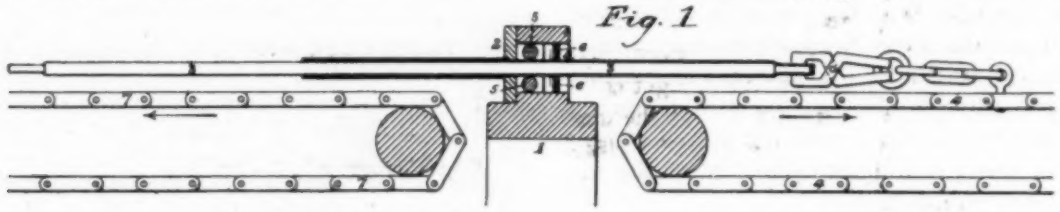

Fig. 2.

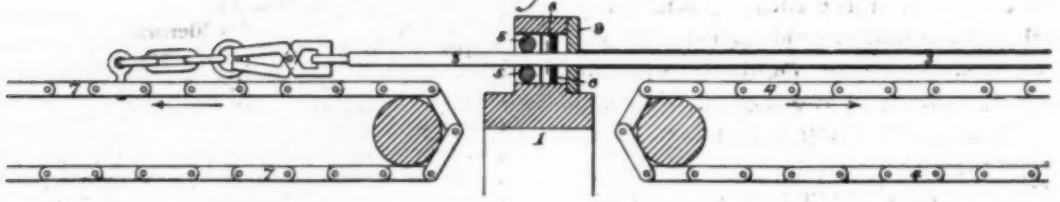

Fig. 3.

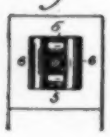

Fig. 4.

NEW DEVICE IN TUBE MAKING.

Bee-Hive and Retort Coking Ovens.

In his report on coal and coke in 1897 to the Mineral Resources Bureau of the U. S. Geological Survey, Edward W. Parker says of the development of the by-product method of coke manufacture:

"There is not going to be any revolution, nor unsettling of existing conditions by the development of the by-product system of coke making, whose progress in this country is shown in the statistics presented in these reports. It has become the habit of late to designate the prevalent method of coke making as the 'wasteful' bee-hive oven, and to criticize unfavorably the action of producers for not only failing to save the valuable contents of the coal, but also for the pollution of the atmosphere by the smoke and gases given off. It is not to be doubted that men and corporations who have millions of dollars invested in coal lands, mines and coking plants will employ such methods in their business as will make the best returns. When we speak of the bee-hive oven as a wasteful method of producing coke we must take into consideration, first, the initial cost of the plant for saving the by-products; second, the increased cost, if any, of operation and maintenance; and third, which is very important, a profitable market for the products. If our great coke producing regions were in a vicinity where the gas produced in the process could be readily and profitably disposed of for manufacturing or domestic purposes, there is no doubt that by-product plants would rapidly displace the bee-hive oven."

At the close of 1897 there were 310 by-product ovens in active operation and 195 in course of construction or contemplated. These do not include the plant at Everett, Mass., the plans for which had been laid for some time, but upon which no actual building was done until the spring of 1898. It is stated that the plant at completion will consist of 1,200 Otto-Hoffman ovens, 400 of which are in course of construction. The work is being carried on by the New England Gas & Coke Co., for the purpose of utilizing Nova Scotia coal, in which mines a large amount of American capital is invested. Contracts have already been made for the disposal, in the city of Boston, of all gas produced.

THE TIN PLATE MARKET.

There has been considerable activity in tin plates during the past week and much of the buying is of a speculative nature for deliveries extending well into next year. Consumers and dealers are alike in the market and the renewed rumors of a tin plate combination of some kind undoubtedly have brought about this condition of affairs. The actual amount of business done has not been as large as would be expected considering the number of inquiries upon the market and the quantities named in many of them. Prices for near-by deliveries are rather stronger than they were a few weeks ago as are those for far futures, the softest spot in the market being December to March inclusive. We quote f. o. b. mill Indiana district:

September to December 100-lb. cokes, ... $2 65, mill.
December to March, 100-lb. cokes. . . . . 2.60, mill.
Beyond March few sellers.

Quotations f. o. b. mlil Pittsburg district, are as follows:
September to December, 100-lb. cokes, $2.67½ to $2.70, mill.
December to March, 100 lb. cokes, . . . $2.60 to $2 62½, mill.
March to July, 100-lb. cokes, ... $2 65 to $2 67½, mill.

No definite information is given out regarding the combination, but it is understood that the plan under consideration is one offered by Judge Moore, who has successfully negotiated other deals of this kind, and that options have been given on many of the properties, including the largest and best equipped mills in the country. The general opinion seems to be that the deal will be a success, though it is impossible at this early date to say in just what form it will be finally consummated.

Personal.

Henry M. Myers, of the shovel manufacturing firm of H. M. Myers Co., Beaver Falls, Pa., died Aug. 30. Included in his estate is life insurance of $125,000.

Charles H. Foote, of the Illinois Steel Co., who has been visiting the Pacific Coast, said in San Francisco in a newspaper interview: "The great obstacle to the extensive manufacturing of steel in California is the scarcity of coal suitable for making coke. Some of the richest manganese ore I have ever seen has come from this State. In the State of Washington steel might possibly be manufactured so as to compete with the Eastern product."

William T. Shepard, for the past three and a half years secretary of the Sessions Foundry Co., of Bristol, Conn., has resigned his position to accept that of secretary of the Tonawanda Iron & Steel Co., of North Tonawanda, N. Y. George M. Eggleston, who has been connected with the Sessions Foundry Co. for a number of years has been elected secretary of that company.

Bessemer Steel Production in Great Britain.

The statistics of the production of Bessemer steel for the first half of 1898 which have been collected by the British Iron Trade Association, show that the total production of ingots in that period was 913,151 tons, against a total of 997,159 tons in the first half of 1897, 905,522 tons in the first half of 1896, and 801,860 tons in the first half of 1895 The make in the first half of 1898 was 84,008 tons less than the make for the first half of 1897, but 8,621 tons more than the make of the first half of 1896. The output of Bessemer steel rails was 436,385 tons, which represents a larger relative output than that of 1894, 1895 or 1896. The total of plates and angles is 39,809 tons; of bars, 115,565 tons; of sleepers. 35,870 tons; while 148,342 tons was marketed in the form of blooms and billets. The years of highest production of Bessemer steel in Great Britain were 1887-1890, the total being over 2,000,000 tons in each of these four years, the highest being in 1889—2,140,000 tons

THE starting up of valley furnaces recently idle has been reflected in an increase in Connellsville coke shipments. In the week ending Aug. 27 there were 13,509 active ovens, according to estimate, with a product of 138,222 tons, as against 135,883 tons in the week preceding The shipments were 7,774 cars, an increase of 320, principally in shipments to Pittsburg and points farther west.

BRITISH IRON MARKET ADVANCING.

Pig iron prices in British markets have been advancing of late, as have those of certain steel products. S. W. Royse & Co., of Manchester, Eng., writing of the market in the last week of August, say: "Affairs in the pig iron markets have been moving well during this month. Prices have advanced about 10d. per ton at Glasgow, and nearly 2s. per ton at Middlesbrough. Shipments from the latter port have been very heavy indeed, and the position at present is very satisfactory; stocks in makers' hands are only small, and buyers are covering their requirements quickly, fearing a further good advance. In the Midlands manufactured iron trade makers are well supplied with orders, and plenty of new business is coming forward, and the outlook is satisfactory."

The following table shows quotations on leading products in British markets, in the last two weeks of August, 1898, and in the last week of that month in 1897:

	Aug. 25, 1898.	Aug. 18, 1898.	Aug. 26, 1897.
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	14 0	14 0	14 3
" Cardiff	14 0	13 6	13 3
Pottery Mine, Nth. Staffordshire.	12 6	12 6	12 6
Hematite, West Coast (at mines)..	13 0	13 0	12 0
PIG IRON—			
No. 3 foundry, Middlesbrough....	42 6	42 3	40 9
Warrants, "	42 7	42 2½	40 4½
Scotch warrants, Glasgow	47 5	47 6	44 6
Hematite warrants, West Coast..	51 11	52 9	47 3½
Cold blast (foundry), Sth. Staffs...	105 0	105 0	105 0
Welsh hematite, Cardiff	.....	.....	52 6
MANUF'D IRON AND STEEL—	£ s. d.	£ s. d.	£ s. d.
Marked bars, Sth. Staffordshire..	7 10 0	7 10 0	7 10 0
Common bars "	6 5 0	6 5 0	6 5 0
Steel rails, Middlesbrough	4 12 6	4 12 6	4 12 6
" West Coast	4 12 6	4 10 0	4 8 9
" Cardiff	.....	.....	4 10 0
Steel angles (eng.), Middlesbrough	6 0 0	5 17 6	5 10 0
" " Glasgow	6 0 0	5 17 6	5 10 0
Steel plates (ship), Middlesbrough	6 0 0	6 0 0	5 5
" " Glasgow	6 0 0	6 0 0	5 7 6
Tinplates, Bessemer L. C. cokes,	s. d.	s. d.	s. d.
South Wales	10 6	10 6	9 4½
COAL AND COKE—			
Best Welsh steam, Cardiff	12s. 6d. nom.	12s. 6d. nom.	11 0
Best West Yorkshire, London	10s. "	10s. 0d. "	8 9
Coke, blast-furnace, Middlesbr'h	13s. 6d. "	13s. 6d. "	13 6
" " Cardiff	.....	.....	15 6

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OHIO'S PRODUCTION OF COAL AND ORE IN 1897.

Chief Mine Inspector R. M. Haseltine, of Ohio, has filed with the Governor his annual report for the year 1897. A table showing the coal delivered at lake ports gives an aggregate of 7,997,248 tons. Of this, 2,745,130 tons was anthracite and 5,252,118 tons bituminous coal. A loss in the former of 430,592 tons and of 513,487 tons in the latter. Of the bituminous coal sent to the lake ports, 3,326,814 tons came from the mines of Pennsylvania, as against 4,337,815 tons during 1896. From the Ohio fields there was received 1,355,138 tons, an increase of 88,103 tons as compared with the preceding year. This represents 25.8 per cent of the bituminous coal received at lake ports, as compared with 21.9 per cent during 1896, 32.2 per cent during 1895, 28 8 per cent in 1894, 46 per cent in 1893 and 45 per cent during 1892. From the State of West Virginia there was received 565,166 tons, a gain of 406,449 tons over the year of 1896. This represents 10.75 per cent of the year's coal, as compared with 3.6 per cent in 1896, 6.5 per cent during 1895 and 5.3 per cent in 1894.

The year's production of coal is given at 12,448,822 tons, a decrease of 463,786, tons from the preceding year and a loss of 1,235,057 tons when compared with the tonnage of 1895. Of the year's coal production, 4,106,124 tons were mined by machinery, which is a gain of 737,775 tons as compared with 1896. The total of 8,342,698 tons produced by pick mining is a decrease of 1,6201,561 tons as compared with the former year. This makes an average yearly production to each miner of 508 tons 1,537 pounds of run of mine coal, which is an individual loss of 45 tons and 963 pounds as compared with the previous year and of 57 tons 1,574 pounds when compared with 1895.

The scale rate for pick mining from January 1 to July 4 was 51 cents per ton. From the close of the strike (Sept. 11) to the end of the year it was 56 cents per ton. The average price paid for mining during the year is found to be 52.8 cents. The average amount of fine coal is conceded to be 2-7 of the output. Thus it will be seen that the daily wages of each miner was $1.27 during the 150½ days that the mines were in operation. It is also found that the average yearly wages were $192.05, as compared with $221.55 in 1896, or $16 a month as against $18.46 in 1896 and $18.48 in 1895.

There were 1,228 mines in the state, 413 of which employed more than ten men. There were 1,126 mines in operation during the year, 37 of which are regarded as large mines. The number of active mines returned is 30 in excess of the number reported in any year of which the Department has a record. The average time worked is given at 150½ days, the same as during the year 1896 The number of miners employed was 22,131, a loss of 14 when compared with the past year. There were 6,654 day hands, a gain of 353 as compared with 1896. The new mines opened in the year numbered 89; there were 102 that remained suspended and 97 were either exhausted or abandoned.

The iron ore production was confined to the counties of Jackson, Lawrence and Scioto and equaled 50,267 tons of hematite, which is a loss of 20,498 as compared with 1896.

The 18 counties which show a production of fire clay return a total of 822,727 tons, an increase of 4,813 tons as compared with the former year. The average time worked is given at 25½ weeks, a loss of 6½ weeks as compared with 1895. As miners 656 men were employed and 3,317 hands were engaged in the manufacture as compared with 601 miners and 3,139 day hands in 1896.

In the production of limestone, the returns show a loss in five of the nine classifications into which it is prepared for the market. The time worked was 131 days, an average loss of 2¼ weeks. The number of men employed is given at 3,398 which is a gain of 212 as compared with the previous year.

It is expected that dealings in American Pig Iron Storage Warrant Co.'s certificates will be authorized on the New York Stock Exchange. For a year or more trading in warrants has been carried on, on the New York Metal Exchange, but the desire is to give a wider scope to these speculative operations. The iron trade of the country has not been partial to the warrant system, but its speculative features have me attractions for outside buyers.

CARNEGIE MIXER PATENT SUSTAINED.

In the long pending litigation over the Jones patent on the direct process in the conversion of Bessemer pig iron into steel, a decision was rendered in United States Circuit Court, at Pittsburg, on Monday, Sept. 6, by Presiding Judge Buffington. The action was brought by the Carnegie Steel Co. against the Cambria Iron Co., infringement of the patent upon the mixer and the process being alleged. Decision was given in favor of the complainant.

Judge Buffington in his review of the process says that, tersely stated, it consisted in blowing air through molten pig iron placed in a refractory lined vessel called a converter, whereby the oxygen combines and burns out the carbon and silicon. It was probably the most potent factor in broadening the scope of the steel industry, cheapening its product, making possible its use in new and wider fields, as a substitute for iron. While the foundation for this advance is based on Bessemer's invention, improvements were made by others. The court discussed the difficulties that had to be overcome in the development of the process, the manner in which the metal had to be treated, the effect of heat and cold on the furnaces, the shifting, unaccountable and seemingly arbitrary working of blast furnaces, and other conditions.

"These varying conditions, results and product incident to blast furnace practice," said the court, "produced corresponding irregularity in the working of converters. Cold blow followed hot blow and vice versa; the conditions were so varying that it was difficult for the converter men to correct the heats, and the workings were so uncertain that it was impossible to produce a uniformly good quality of steel. That these grave difficulties existed and bade fair to defeat the use of the Bessemer direct process is shown: first, by the resort by manufacturers to the more expensive cupola practice; next, by the literature of the art, and, lastly, by the proofs in this case."

The Direct Process of 1882 at Edgar Thomson.

Judge Buffington then went into a detailed explanation of the original purpose of the Bessemer process, its advantages and drawbacks, and a review of what some of the most eminent metallurgists of the world have had to say about it. In 1882 the direct process was installed by the Carnegie company at the Edgar Thomson works, near Pittsburg. The proof, the court states, is clear that the grave known difficulties of the non-uniformity of the direct process were met for several years. Mr. Carnegie himself said: "There were both advantages and disadvantages. The advantages were that we got less sulphur in the metal by the direct process and we also thought we would save cost; but the disadvantages were so great that we often debated whether to abandon the process or not. We found it impossible to get uniform quality of rails as well as by the cupola method; we found that we could not make metal as the furnaces made it. We tried to fill the furnace cars partly from one furnace, partly from another, but this was not found practicable, trying to tap furnaces at irregular times producing irregular working."

The testimony of a number of experts who were examined in the case is referred to. They all describe the many and varied difficulties encountered in the practical operation of the direct process. One of these witnesses made the statement that "the amount of chilled heats with the direct process over the cupola process would be fully 50 per cent I have seen as many as 14 consecutive chilled heats with the direct process."

Capt. Jones's Patent.

In this state of the art, application was made for the patent in suit by Capt. Wm. R. Jones, now deceased, then superintendent of the Edgar Thomson Bessemer plant. He was a steel man of long experience. Simply stated, Jones's idea was the creation and maintenance of a great pool of metal between the blast furnace and converter plants, through which all incoming and outgoing metal should pass. By this means each converter charge drawn from this homogeneous mass was so closely akin in heat and constituent parts to the one preceding and to the one following it that each charge was an index to the converter man of the thermal and chemical character of the one to follow. To replace the withdrawn converter charges, fresh additions of blast furnace molten metal were

constantly added. The court says: "This simple, commonplace, practical principle, which after all is the underlying principle of the governor in the use of steam and the fly wheel in the regulation of power, Jones embodied in his process patent No. 404,414, issued June 4, 1889. Infringement is alleged of the second claim. The process, so far as this claim is concerned, is disclosed and described in the specification."

Then follows a detailed description of the improved method, and the court continues: "That the Jones process was a radical and important one, that the benefits and profits arising from its use were great, there can be no doubt. The size of the record, the number and character of experts and counsel concerned, and the earnestness with which this case has been contested, in themselves confirm the testimony of its value in the art. But the testimony itself in that regard is quite convincing. Indeed, we do not understand the respondents' witnesses in effect deny the value of the process; what they allege is that it was not original with Jones, but was well known for years.

"The regard in which it is held by practical and theoretical minds is shown in the number of witnesses to whom reference has already been made. . . . . It is contended, however, that the Jones process was anticipated in the English patent of Deighton, No. 3,672, of 1873, for an improvement in the manufacture of Bessemer steel. The authorities leave no doubt as to the character of the disclosures necessary in a prior patent or publication to avoid a subsequent one, to-wit, the information therein must be so full, clear and precise that one skilled in the art and acting in the then state of knowledge, can from such a patent or publication perform the process or make the thing covered by the patent sought to be anticipated.

"It is contended that the respondents have secured satisfactory results, practically those obtained by the Jones process from an experimental plant constructed in accordance with the instructions of Deighton's patent. This plant was constructed after suit was brought and no opportunity given complainants to inspect the same or to witness its operation. We are by no means satisfied that the means used were a reproduction of Deighton's or the process employed was not the identical one of Jones."

Wherein Infringement Consists.

After dealing at length with the merits of the improved method and comparing it with the one used by the respondents, the court says: "It is, however, further contended that the claim in issue is not a process within the meaning of the patent law, and, therefore, not patentable. An examination of the cases cited satisfy us that it is. Section 4486 R. S. authorizes the grant of a patent to any person who has invented or discovered 'any new and useful art, or any new and useful improvement thereof.'

"Has infringement been shown? In this connection, the question of the apparatus employed is of importance only as bearing upon its adaptability for the practice of the Jones process, for infringement of process, not apparatus, is charged. Respondents' apparatus consists of a large covered refractory lined vessel of about 300 tons capacity, adapted to be tipped by hydraulic pressure, having a receiving hopper at the rear and a pouring spout at the front. Both a blast furnace plant and a cupola system supply metal for its Bessemer converter plant, the former about two-thirds, the latter one-half the metal used. It is to be noted that the cupola system continues, since the installation of the reservoir, to deliver its metal by ladle to the converter direct and not through the reservoir. The metal from the blast furnace enters the receivers in approximately 15-ton ladle lots, and is withdrawn in approximately 12-ton ladle lots. In accordance with the natural way of using a reservoir it is ordinarily kept well filled up.

It is quite clear that infringement takes place. That initial mixing rather than storage is the purpose of the reservoir is shown by the fact that cupola metal is not stored, but served direct in ladles to the converter plant. And that the homogeneous mixture once obtained is used as a dominant pool to produce a graduated, non-abrupt product, is shown by the chalk-like minimum limit of 175 tons. With such a permanent dominant pool in constant use, we are clear that respondents' practice infringes the second claim of the Jones patent in both letter and spirit. Indeed, Mr. Morgan (one of respondents' witnesses), himself says: 'With the exception of additions of cupola metal, I do not know that there is any material difference between our practice and that described in the second claim.' The exception noted can have no effect on the question of infringement. In substance, as carried on by respondents, it is a disconnected operation, wholly independent of the mixer, the only exception being that where there was not sufficient cupola metal for a full converter charge, the shortage was drawn from this mixer. For the reasons stated, we are of opinion that infringement of the second claim is shown."

EFFECT OF SAND IN THE CUPOLA.

I have to confess that my views have undergone a decided change, within the past year, with regard to the effect of sand on the iron that is to be melted in the cupola. The natural supposition is that the coating of sand on the gates, and the rejected castings, and also on the pig iron, would retard the melting. Many years ago I read and studied very closely Dr. Kirk's book on founding, and, if I mistake not, he says that the pig will melt most readily at the fractured end, because of the total absence there of the sand coat. From this I inferred as a matter of course, that the sand coating was a positive detriment, as protecting the iron from the heat. A good deal has been written in support of this theory. Latterly some of the blast furnaces have taken to using iron molds instead of sand pig-beds, and I, as well as a great many others, expected that this would increase the speed, as well as reduce the cost of melting.

Until a little more than a year ago it had always been my practice to tumble the shop scrap so that it should go into the cupola perfectly clean. I am now of opinion, however, that this, instead of being a measure of economy, was, on the contrary, an element of cost. The practice that led up to this conclusion was purely accidental, and would not have been followed but from sheer necessity. We simply had not sufficient tumbling-mill capacity to enable us to clean the shop scrap, and so it went into the cupola with the sand on it.

To my surprise the melting seemed not to be retarded an iota, nor did there appear to be any other detrimental effect On the contrary, I am convinced that the sand coating acted as a flux, and so obviated the necessity for the use of limestone. It may be that the melting of a limited amount of iron could be expedited by abcence of sand, but I think that in the absence of sand or other flux the cupola would soon become clogged with solidified ash, cinder, etc., and that the whole effect would be to retard the melting to a considerable extent. During all this time I found it entirely unnecessary to use any sort of flux, other than the sand that clung to the iron.

A few years ago a couple of men went through the country introducing, for a consideration, a method of improvement in melting practice. When they ran up against Mr. Keep of Detroit, Mich., he found that their plan was to introduce sand into the charges. He told them that he was already doing that very thing. They wished to know how he "got onto" the practice and how he did it, and he answered that he used the shop scrap and the pig iron without cleaning, and that there was abundantly enough sand for the needed flux without adding any more.

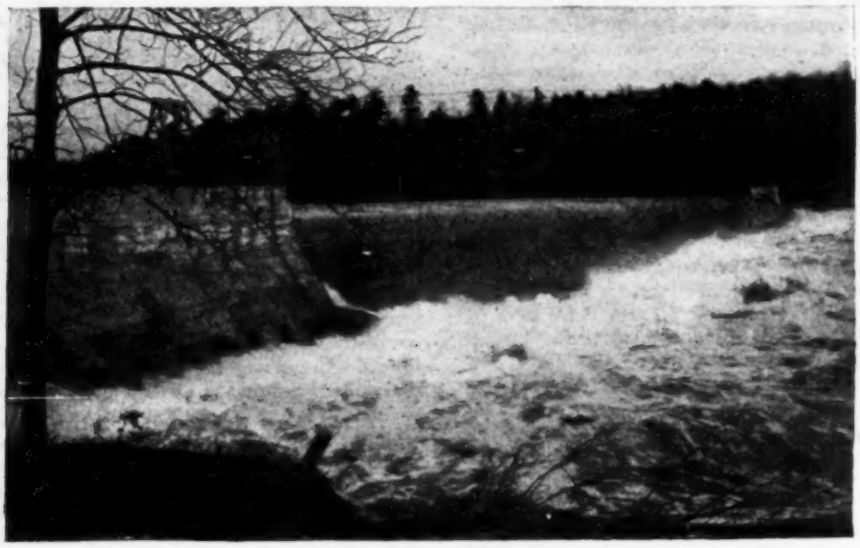
It may be that some kinds of sand are better than others for this purpose, but the practice is followed in widely separate parts of the country with perfect success; which would seem to indicate that almost any ordinary molding sand that clings to the casting will operate as a good flux, and, in view of my own experience, I do not hesitate to advise foundrymen to try the plan.—[E. H. Putnam, in Chattanooga Tradesman.

THE statements concerning the difficulty of making desired deliveries of some grades of Southern iron are confirmed by the withdrawals of warrant yard iron, which have been at an unusual rate in the past month. In the 11 days ending Aug. 31, there was taken from warrant yards 4,100 tons, against 200 tons put in yard in the same time. The net stock in yard Aug. 31 was 235,800 tons. On the same date in 1897 the amount in yard was 250,300 tons; on Aug. 31, 1896, 157,200 tons.

THE New Castle Engineering Co. has an order for an inclined hoist for Mabel Furnace, at Sharpsville, Pa.

ELECTRIC TRANSMISSION FROM THE HUDSON.

Early in 1897, the attention of R. N. King, president of the Stillwell-Bierce & Smith-Vaile Co., of Dayton, O., was drawn to the power available in the upper waters of the Hudson River at Mechanicville, N. Y. His experience with water powers and their development led him speedily to recognize the possibilities which there lay ready to hand. The site is two miles from Mechanicville, 11 miles from Troy, 18 miles from Albany, and only 17 miles from Schenectady, where, covering not less than 130 acres of ground, the largest electrical works in the world—the plant of the General Electric Co.—are operated from an extensive steam plant with which the electrical power from the Mechanicville cataract could readily compete. Negotiations resulted in the General Electric Co. arranging to purchase a large amount of power and its advice as to the electrical equipment was closely followed.



THE MAIN DAM AND WASTE GATES.

At the point chosen for the development the Hudson River is divided by Bluff Island into two channels with a combined width of about 1,200 feet. The western channel is used for the head and tail race. The power house starts from and extends out into the river about 215 feet and is connected with Bluff Island by a concrete dam 26 feet high above the bed of the river, 10 feet wide on top and 18 feet wide at the base. The upstream face is vertical and the down stream face sloping. This dam is provided with fuor arched waste gates 4 ft. wide and 6 ft. 9 in. high. The dam is 16 ft. high above the river bed 8 ft. thick immediately below the crest, 16 feet thick through the base and 30 feet thick through base and apron. The dam is set between massive abutments anchored to the rock sides of the river bank and island. The eastern is 20 feet long, 26 feet high above the river bottom, 16 feet thick at the top and 34 feet wide at the base; the western abutment is 100 feet long, the other dimensions being similar to those of the eastern abutment. The length of the spillway between abutments is 800 feet. In the western abutment are 12 arched waste gates each 4 ft. wide and 6 ft. high, opened and closed by heavy iron hoists operated by rack and pinion.

The power house lies between the west bank and the short concrete dam and is practically a continuation of the dam. It is of concrete with the exception of the upper walls. The foundations are carried down to the bed-rock, and the house is carried on heavy steel box web girders resting upon steel I-beam columns. The latter are imbedded in concrete walls carrying arches which form the floor of the generator room and the floor on which the wheel flumes rest. The walls form a separate and distinct tail race 22 ft. wide for each set of turbines from which the water may be shut out at will.

The house is divided into two parts by a thick head wall. The upstream part contains wheel chambers for seven 1,000 h. p. wheels of which five only are at present occupied. The downstream portion contains the wheel governors, and the electrical apparatus. The length of the power house proper is 257 ft. 6 in., and the total width 66 ft. 6 in. At the western end a brick extension runs up stream 87 ft. 5 in. long and 44 ft. 10 in. wide. The western stream running between the bank and the island forms the fore-bay, 300 ft. long. The main tail race is 205 ft. wide and joins the main stream 750 ft. below the power house.

Arched chambers are provided for seven main wheels and two exciter wheels. In the head wall of each main chamber is set a heavy cast iron cover through which the turbine shaft passes in water-tight packing box, carrying the ring oil bearing for the shaft. The saving in space effected by the new arrangement of housing and coupling together of the turbines, patented by the Stillwell-Bierce & Smith-Vaile Co., has tended to diminish considerably the size of the power house. A 20-ton crane from the works of Pawling & Farnishfeger, Milwaukee, runs the entire length of the dynamo room.

UP-STREAM SIDE OF POWER HOUSE WITH FOREBAY.

The main wheel plant consists of ten pairs of 42-in. horizontal Victor turbines of the latest type built by the Stillwell-Bierce & Smith-Vaile Co. Each main turbine consists of two pair of wheels each of which at the normal speed of 114 revolutions is rated at 250 h. p. The total power of each set of turbines is, therefore, 100 h. p. Five units are now in

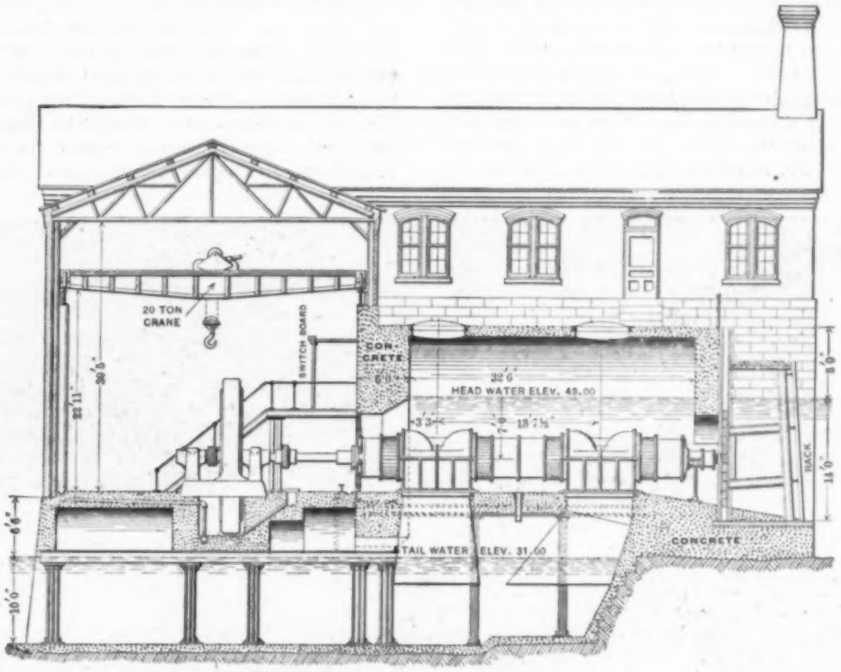
position, the two additional turbines will be installed shortly. The head under which the water wheels are operated is 18 ft. The turbines for the exciters consist of three 18 in. Victor cylinder gate wheels, having, at 259 revolutions per minute, a total of 300 h. p.

Two draft tubes lead from each main turbine, the forward tube descending straight into the tail race beneath the power house, the rear or upstream curving and flaring downward and outward. Each tube is 9 ft. 6 in. in diameter at the bottom. Two draft tubes are also allotted to each set of exciter wheels, the rear tube 4 ft. in diameter and the forward tube 3 ft.

The speed of each set of main wheels is regulated by a Geisler electro mechanical governor, mounted on a platform directly over the turbine shaft, and between the head wall and the generator. This governor is now in use in many of the most important electric power transmissions in this country, including those of Columbia, S. C.; Pelzer, N. C.; Lachine, Que ; West Kootonay, B. C.; Montmorency, Que

The dynamo room is 255 ft. long and 34 ft. wide. The ultimate generator capacity of the station is 7,000 h. p. in seven generators each of 750 k. w. capacity. Five have been installed and are now running. They are three-phase 40 pole, 750 k. w. 114 revolution alternating current machines having revolving fields and stationary armatures delivering 36 amperes of current at 38 cycles and 12,000 volts to the transmission lines. By using the revolving field type of generator step-up transformers to raise the voltage for transmission purposes are dispensed with.

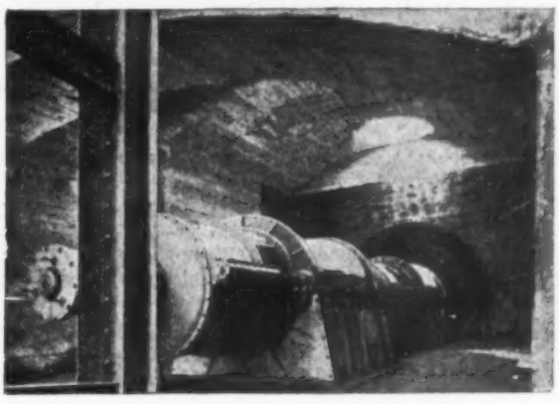
The alternators are similar in their main characteristics to those successfully used in the development of the power of the Lachine Rapids at Montreal. The armature frame or ring is of the box type, 15 ft. 4 in. in diameter, and 36 inches wide. It is bolted to a base 18 ft. 2 in. long by 10 ft. wide, along which it may be moved parallel with the shaft, in order that the revolving field spider and poles may be uncovered should occasion arise. The armature winding is protected on each side by iron shields. The pillow blocks are also bolted to the base and the bearings are of the spherical seated self-oiling type used in all General Electric generators. The field ring is bolted to the spokes of the spider. It carries 40 poles, each securely fastened by two bolts to the ring. The whole revolves on a shaft 15 in. in diameter provided with a rigid coupling bolted to a similar coupling on the turbine shaft. The exciters are placed one on each side of the stairway leading to the switchboard gallery. They are 6-pole 100 k. w. 125-volt standard direct current machines with ribbed field frames and iron clad armatures.



SECTION THROUGH WHEEL CHAMBERS.

Each generator panel is equipped with three single blade double throw, quick break, high tension switches. As these latter are to break current of 12,000 volts, they are tested to break without difficulty currents of 21,000 volts. The switches are without handles. An eye is made in the end of each blade into which a hook at the end of a stick may be inserted and the switch opened by the attendant from a safe distance. Further, to prevent any dangerous arcing from blade to blade, marble barriers 1¼ in. thick, 3 in. long and 12 inches wide from the face of the board are erected between each blade. On the back of the panels are the high tension fuse blocks designed for 20,000 volts, and, like the switches, mounted on corrugated hard rubber cones. The fuse of aluminum is held tightly between two clips attached to

A SHIPMENT OF VICTOR TURBINES.

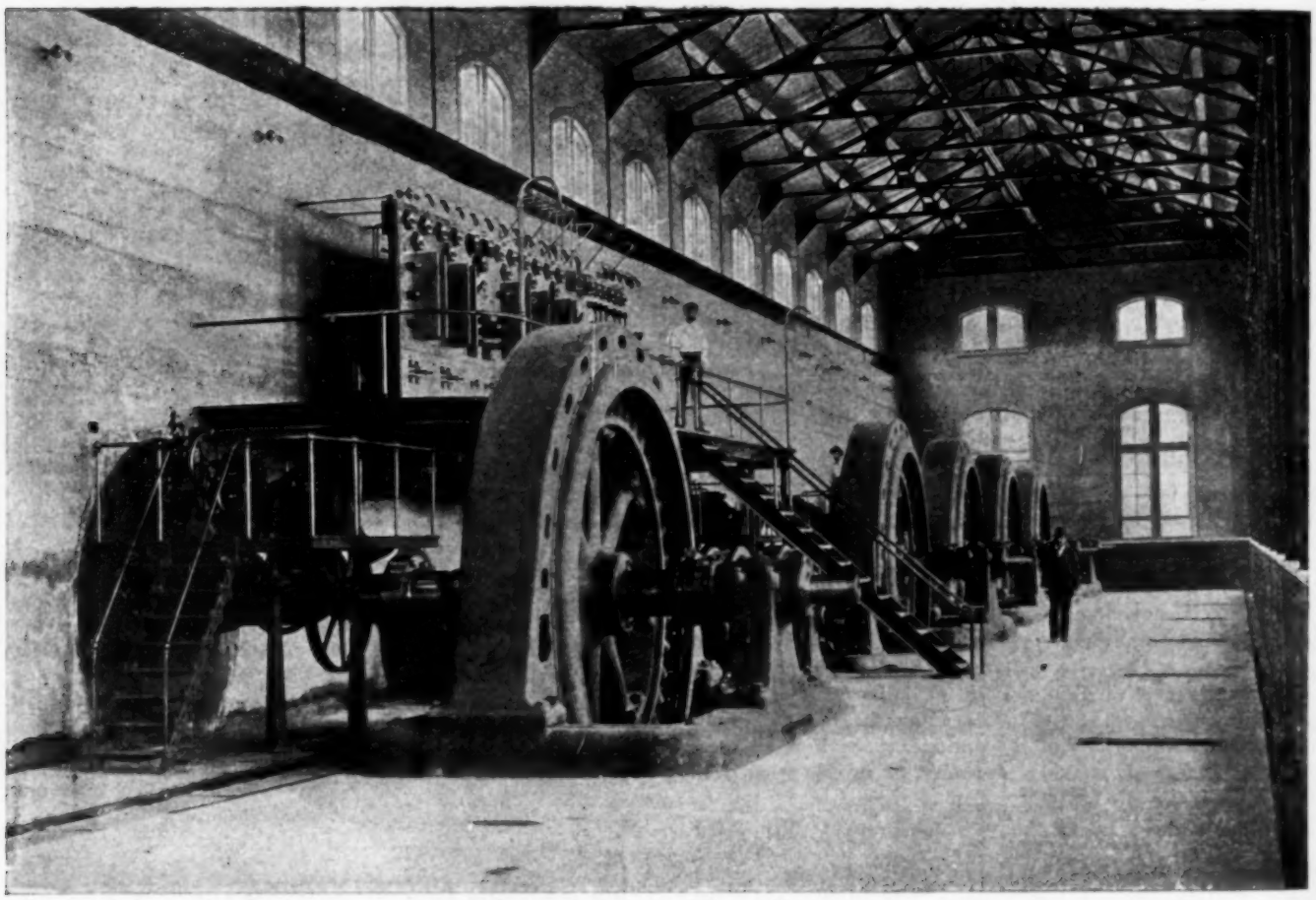


A MAIN WHEEL CHAMBER.

springs and as soon as an increase of current in the line melts the fuse, its two halves are instantly pulled apart and the formation of an arc prevented. Each outgoing line is provided with a circuit breaker or automatic plunger switch, by which contact may be so suddenly broken that arcing is impossible.

The line from Mechanicville to Schenectady consists of three No. 000 B. & S. bare wire. They are carried on poles 30 to 60 ft. long and all eight inches in diameter at the top. For lightning protection, a barbed wire frequently grounded, runs along the tops of the poles.

The introduction of this transmitted electrical power into the factory has worked a considerable change. Heretofore all the machinery was driven by electric motors, while the testing department demanded an independent supply of current. There were, therefore, two distinct generating plants. The 550-volt motors in the testing department were supplied from an engine-driven multipolar generator of 500 k. w. capacity, while a smaller engine drove a number of exciters which allowed of independent control of the excitation of all machines in this department. The factory is operated by a number of



INTERIOR OF POWER HOUSE—DYNAMO ROOM.

250-volt motors running on the same circuit as the factory lights. These motors are not changed and the steam plant which supplied them is retained as a reserve in case the power from Mechanicville should fail. The electric power plant superseding the present steam plant at the works, therefore, consists of two synchronous motors, one of 500 k w., the other of 100 k. w. and three 400 k. w. rotary converters—the synchronous motors for the testing department, the converters to supply current to the factory motors.

The large engine driving the 500 k. w. multipolar generator is superseded by the 500-k. w. synchronous motor. This is a 12-pole 400-revolution machine of the revolving field type, wound directly for 10,000 volts. The small engine driving the exciters is replaced by the 100-k. w. synchronous motor. The three rotaries supplying 250 volt current to the factory motors are 10-pole, 400-k. w. machines receiving the three-phase current from the air blast transformers. When connected in multiple they furnish current at 250 volts, but as they may be called upon to furnish current to the testing department, in case the demand exceeds the supply, from the synchronous motor driven machine, they may be connected to give 500-volt current, operating in parallel with the railway generator, driven by the synchronous motor in the testing department. The rotaries are operated in parallel and all the factory motors, the factory railway and all the factory lighting are operated from the same direct current circuit.

THE Edward P. Allis Co., through its Pittsburg office, has made the following sales: Two pairs vertical cross compound steeple type furnace blowing engines. Each engine will be provided with two air cylinders, with an effective diameter of 96 inches by 60-inch stroke; when running at their rated speed, 50 revolutions per minute, will deliver 50,260 cubic feet of free air per minute, at a pressure of 25 pounds per square inch. The air cylinders will be equipped with Kennedy's patent induction and Reynolds' patent delivery air valves. Each engine will be supplied with one 50-inch diameter high and one 96-inch diameter low pressure steam cylinder, each 60-inch stroke. The Schoenberger Steel Co. has purchased a vertical cross compound mill engine, having one 42 inch diameter high and one 84-inch diameter low pressure steam cylinder, each 60-inch stroke. This machine will be fitted with a rope sheave wheel 24 feet diameter, having a face of 16 feet, turned and grooved to receive 70 1¼ inch diameter and 26 2-inch diameter ropes. The rope wheel will have a weight of 250,000 pounds. The Schoenberger Steel Co. has also purchased one horizontal tandem compound engine, with one 32-inch diameter high and one 64-inch diameter low pressure steam cylinder, each 60-inch stroke. The engine will be fitted with Reynolds' 1890 heavy rolling mill type frame and will be provided with a fly wheel 24 feet diameter, weighing 120,000 pounds. This engine will be provided with Kennedy's patent construction of overhanging crank. The engine will drive direct trains of rolls on each side.

THE Star Brass Mfg. Co., has removed from 31-37 Lancaster st., Boston, to 108-114 East Dedham st. The company manufactures non-corrosive steam gauges, stationary, marine and locomotive pop valves and general steam engine and boiler appliances.

FLUOR SPAR IN METALLURGICAL WORK.

An article in the *Chemiker Zeitung*, some time ago, by Dr. Foehr, a German chemist and metallurgist, called attention to the growing tendency to return to the use of fluor spar as a flux in metallurgical operations. The writer stated that until the beginning of this century fluor spar was considered indespensable, but was replaced to a large extent by limestone, on account of its being apparently much cheaper. The two fluxes, however, are so very different in their action, even when accomplishing somewhat similar results, that no comparison is just when based merely on the relative price per ton.

In the United States fluor spar has not been used to the same extent as in England and on the Continent. Two reasons are assigned: The lack of information as to its value and the manner of using it to obtain good results, and the uncertainty of the supply. This latter cause no longer exists, as extensive and more workable deposits have lately been opened up.

The use of fluor spar in metallurgical work may be considered under three heads: 1. In the blast furnace, especially for the production of ferro-silicon and ferro-manganese; 2, in the open-hearth steel furnace, especially with the basic process, to make more fluid the slag, to help carry off the phosphorus, and to reduce the sulphur; 3, in the foundry cupola, to make the iron more fluid, permit the use of greater quantities of the lower grades and of scrap, and to reduce impurities.

In the blast furnace, the smelting of very refractory ores is almost impossible without fluor spar. But even with good ores, there are advantages in the use of fluor spar which do not appear at first glance. Thus the reactions of fluor spar and limestone respectively are as follows:

$$2CaF_2+3SiO_2=2CaSiO_3+SiF_4$$
$$3CaCO_3+3SiO_2=3CaSiO_3+3CO_2.$$

These formulas show a quantitative economy in favor of fluor spar of 300 to 156. But Dr. Foehr claims that one part of fluor spar goes further than 10 parts of limestone. The fluor spar reduces the quantity of fuel required, forming but two parts of slag where limestone forms three, and it is probable that it forms fluor-silicate, whereby heat is likely to be liberated. When it is blown in the tuyeres it forms an energetic solvent. In the manufacture of ferro-silicon, an iron containing 10 per cent silicon may be obtained in an ordinary blast furnace from silicious ores if fluxed with fluor spar and the slag is strongly basic. The fluor spar first reduces the silicon energetically, forming fluor-silicon, and this is reduced to silicon by the hydrogen of the furnace gases and possibly also by the coke. A peculiarity of fluor spar is its property of reducing widely different bodies. It is also advantageous in the manufacture of spiegeleisen, using a manganese combination and fluor spar. In this case a very basic slag, rich in fluorides, is desirable.

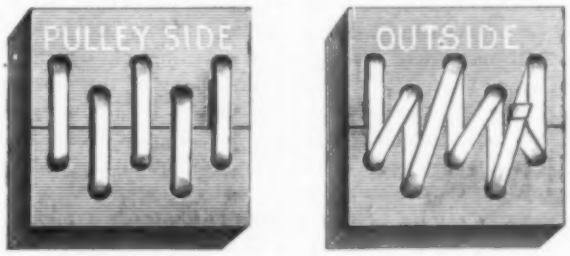
In basic open-hearth steel plants in the United States, the use of fluor spar is steadily growing, its main function being to render more fluid the slag, not only on the hearth but in the ladle and mold as well. In the Krupp and Rollet methods of dephosphorizing pig in basic lined cupolas fluor spar is used to carry phosphorus into the slag.

In foundry work the value of fluor spar as a fluxing agent seems to have been discovered first by the manufacturers of chilled car wheels. Unlike chill rolls, car wheels are cast from iron melted in a cupola. When limestone is used in cupola work, its function is merely to slag off the ashes of the fuel. It has no important chemical action on the iron, excepting the unfortunate one of tending to slag the silicon. Fluor spar, while accomplishing all that limestone does in fluxing off the ashes with a smaller quantity, has an important effect on the iron, keeping it gray and soft by holding the silicon as an alloy, while it tends to carry some phosphorus and sulphur into the slag. While in the manufacture of car wheels, where a low silicon iron is necessary, the advantages of fluor spar have been first appreciated, in other work its use may be advantageous, since it permits the use of a greater quantity of scrap without unfavorably affecting the melting ratio, and also the use of lower grades of iron for melting. It is found, however, that the favorable effects of fluor spar do not increase indefinitely as the quantity used is increased. The best results seem to be obtained when about one-third of one per cent is employed, while beyond one-half per cent the results are distinctly inferior for certain classes of work. One reason given for this is that the larger quantity of fluor spar tends to hold manganese contained in the iron from slagging. In other classes of work much larger quantities of fluor spar may be employed to advantage to reduce the quantity of slag and make the iron more fluid. In English foundries the use of this flux is much more common than in the United States.

Until recently the only worked deposits of fluor spar in the United States were located near Rosiclare, Ill. The supply was uncertain at times owing to water in the mines and poor roads. Lately a valuable bed of almost pure fluor spar has been opened in Kentucky. James Irwin & Co., manufacturing chemists of Pittsburg, Pa., have secured control of the principal bed in Kentucky, as they require a large quantity of fluor spar for the manufacture of hydro-fluoric acid. The Kentucky Fluor Spar Co., for which James Irwin & Co. are sole agents, was formed to operate the mines. The deposits have been found to be of such good quality, averaging from 94 to 98 per cent of pure fluoride of calcium, that it was decided also to put the product on the general market, and already a large trade has been built up among steel makers and foundries. The fluor spar is furnished in different grades in the raw state, and is also ground to a powder for the use of glass houses in the manufacture of opalescent glass, and for manufacturers of enameled ware, such as bath tubs, etc.

MALIN'S METALLIC BELT LACING.

The use of the Malin flat metallic belt lacing, as applied in the manner shown in the accompanying cuts, is being pushed by the manufacturers on the score of the economy and efficiency. The lacing is wound on a hubbed wheel which is mounted in a wooden box, and the metallic ribbon is pulled out like a tape line, obviating the danger of kinking or tangling. There is no waste, as with some other materials, since just enough lace is cut off to lace the belt. The joint is so



slightly thicker than the remainder of the belt that there is no strain on belt or shafting when the joint goes over the pulley. This saves wear on both belting and machinery. The strength of the lacing, it is stated, is much greater than the strain on the belt when transmitting the maximum of power. Computations of cost to the consumer make it less than one cent for each inch in width of belt laced. The manufacturers are The Malin & Co., of Cleveland.

SANDERSON & PORTER, contractors for the Meriden & Compounce Electric Railroad Co., have let the contract for furnishing several bridges and buildings on the line of this road to the Berlin Iron Bridge Co., of East Berlin, Conn. The work consists of seven spans of bridges, varying in length from 10 feet to 65 feet; a car barn 50 feet wide and 100 feet long; and a power house 45 feet wide and 75 feet long. The bridges are of steel, and the buildings have steel framework, brick side walls and fire-proof roofs. The roof of the power house is covered with corrugated iron and lined with the Berlin Iron Bridge Co.'s patent anti-condensation roof lining. This lining has shown itself efficient in preventing condensation and moisture from the underside of covering and doing away with the danger and annoyance of water dripping on expensive and delicate machinery below.

THE Akron Steam Forge Co., Elwood, Ind., has sold its entire plant, consisting of large steam hammers, forge machinery tools, buildings, land, gas well, and complete equipment to Reade & Bowler, of Cleveland, who are offering them for sale.

AMERICAN STEEL IN GREAT BRITAIN.

The *Engineer*, of London, in a recent issue refers to the increasing sale of American steel and equipment to British manufacturers in a light indicating more faith in the permanence of this trade than some authorities on the other side have professed. Quoting a leading Sheffield manufacturer to the effect that it does no good to ignore the truth about these imports, or to attribute them to American "bounce" and desire to advertise, the *Engineer* says:

"He mentioned that a single firm in London is now receiving United States steel at the rate of nearly 250 tons per annum. American steel, he added, is also being sent into Birmingham in very large quantities. It is mainly used for bicycle work. In bright-drawn steel for bicycle purposes, for nuts, screws and bolts, or anything that can be made in large quantities by means of automatic machinery, the American steel is preferred, not merely by the manufacturer who finds it lower in price, but generally by the workman, as its uniform temper enables him to work it smoothly right through with considerably less wear on the tools. That the influx of steel from America is not mere bounce or advertisement, is evident by the concern shown by some of our manufacturers. At the last meeting of the Ebbw Vale Steel, Iron & Coal Co., Ltd., Wales, one of the directors stated that there would be anxiety for some time to come in connection with the steel works, owing to the new appliances and the improved methods in America and on the Continent, as well as the keenness of competition. Another director—who is also a director of a large steel concern in Sheffield—attributed the serious period of depression which had fallen upon the Ebbw Vale Steel Works to the flow of steel from America into this country.

"Some time ago a Sheffield manufacturer asked us to look at several large consignments of American-made files he had just received. Several of these were in the finer and smaller sizes which are only produced in this country at prices very much higher than they can be delivered in England from the States. Undoubtedly the American file is ligter than the British, and the objection to it on this side is that it cannot bear recutting; but, as this manufacturer explained to me, files can be made at such low prices nowadays that few people trouble themselves about recutting at all. As for prices, Sheffield manufacturers charge considerably higher than the Americans in most of the sizes, and many of the workers on brass, iron and steel prefer the American. The foreign files are said to be particularly favored in the great districts where the textile trades are carried on, and the quantities now being received in London and Birmingham, the principal distributing centers, are far greater than even the trade supposes.

"Passing from Sheffield to distinctly Birmingham industries, a word may be said about brass rods. By these we mean the form in which the brass is supplied for making brass unions, etc., out of solid rods, round or hexagon. It is no pleasure for the British manufacturer to find himself compelled to use American-made brass, but he claims that it is drawn so much truer than the English that it can be worked in automatic machinery with much less trouble and with greater economy. Asked as to the price, a leading manufacturer stated that it is from 15 per cent to 20 per cent cheaper than the English. In another article, which is rapidly growing important—steam india-rubber hose piping—one authority said he had the American make delivered on his premises at 20 per cent to 25 per cent cheaper than the English makers had supplied. Here it is only fair to say that the railway rates help the foreigner, the rate from New York to Liverpool being positively lower in several instances than from Liverpool to Sheffield.

"Another item may be mentioned—the smaller sizes of malleable iron castings. American firms are at this moment delivering these castings in Sheffield at fully 30 per cent below local prices. Here again it is but right to admit that the railway rates materially assist the foreigner. It will not do to say, however, of these castings that they are simply sent over by way of advertisement, or that they are not of good quality. The very opposite is the case. They come over in the regular way of business—a business which is steadily increasing—and they come over of such quality that the workmen themselves are openly heard to confess their preference for the American production. In one of the establishments where they are used in very large quantities, we asked various workmen, as we passed from place to place, which he preferred—the American or the British casting. Although 'Yankee notions' are as little in favor with the British worker as things 'made in Germany,' the invariable reply we got was that the American casting was preferred because it was truer and more uniform in quality. The users, too, mention another difficulty which is surely capable of prompt remedy. That difficulty is to get adequate deliveries of these small malleable castings where large quantities are required. The head of one house told us that he had often been disappointed in not getting his order completely filled, and in the end has had to send a cablegram to American manufacturers, who have sent him all he wanted in a much shorter time than he could have got them within a few miles of his own door. It is impossible for anyone who is much in the habit of visiting the large industrial establishments of this country to avoid seeing how rapidly American labor-saving machines are being utilized. Specific instances are constantly coming to our notice of this; instances where British manufacturers, who have been fighting all their lives against using American machines, have latterly, through failure to get what they wanted in England, been compelled to adopt foreign-made lathes and other special machines, and now they say they would not be without them.

"The business of supplying these American inventions to British industries is only just beginning. It is not to the interest of British manufacturers to admit this much, but they are gradually being forced to the conclusion that there is no denying the advance of the American, both in his methods of production, his application of those methods in the use of the machinery by which they are applied, and the men by whom they are worked."

American Hardware in England.

"Great Britain will have to make up its mind to se a good deal more of the American in our markets than has been the case hitherto," says the *Hardware Record*, of London. "Trade is at present so good in the States that all the available productive power is required for home demands, but several manufacturing friends who have just returned from the States, where they have been on business, tell our Sheffield correspondent that the manufacturers there are so largely increasing their output that they will promptly overtake home requirements and enter vigorously upon European markets. 'You will soon have us over amongst you,' said one large producer to a Sheffield manufacturer, 'and I will show you several of the lines in which we intend to do business.' These lines included bright drawn steel, and all the cheaper grades of steel, brass rods, files, small malleable iron castings, automatic machinery for all purposes, steam (india-rubber) hose-piping, and other goods. These were invariably from 25 per cent to 50 per cent cheaper than the prices quoted in this country. It will not do to say that the quality is inferior, for at two establishments in Sheffield, where American articles are being used in increasingly large quantities, the workmen prefer both the raw steel and brass suitable for working in automatic machines, and also the files and the malleable iron castings. It is quite clear that Amercian competition is going to be far more severe than it is at present"

PRESIDENT HILL, of the Great Northern, says in an interview: "The wheat production of the West has perhaps reached half its maximum amount. Only the best of the land back from the railroads is now in use, but a greater demand will bring the rest out. I should not be surprised if Niagara Falls became the great milling center of the country. The line of least resistance will be to take the wheat of the Red River valley to Duluth and through the lakes to the Niagara water power, where wheat can be made into flour cheaply and near the mouths of consumers. If our Government would make it possible for us to furnish people in Asia with a larger part of the food they eat, we should be able to raise the price of the wheat that goes to Europe. The solution of the problem is largely in the restoration of our merchant marine. I believe the best plan would be a small export bounty, say $2 a ton on all goods exported in American ships for a period of 10 years. Suppose we sent 1,500,000 tons a year, which would be a ship carrying 5,000 tons every business day, it would cost the Government only $3,000,000 annually. Think of the value of the cargoes and the amount that would come back to us from such an export trade."

KEEPING MINE ACCOUNTS.*

BY A. J. YUNGBLUTH.

It is my purpose in presenting this paper to deal more generally with the arrangement of mine accounts for the cost sheet than with the method of keeping them in detail. It may not be out of place to say, however, that the success of the proper arrangement depends upon the method employed in keeping the accounts. It is necessary in order to get close figures of cost at the end of each month, that the method of handling the supplies should be on the basis of cost, freight and drayage added, and the supplies issued only upon requisitions from persons authorized. This insures the proper charging of the material, besides being a check on the supply clerk in issuing supplies, so that his account will be credited with everything issued or sold, while at the same time the person who signs for the material will see that he receives the proper weight or count. It thus does away with the old method where the profit on the supplies would cover up any loss there might be by reason of carelessness in the supply house, in not charging properly all supplies issued. Having this department well under control insures accuracy in the figures of cost for supplies as presented each month, knowing that there will be no material change at the end of the year by profit or loss in the supply account.

The distribution of labor is, of course, very important, and great care must be taken in keeping the time in a manner that will insure the various accounts being charged for the time actually worked in each department. This is most readily done by opening a page in the time book for each different job, and recording the time worked by each man on that particular work. It may be that several jobs will be charged to the one account when the distribution sheet is made up for the journal, but it will permit getting the cost accounts with more detail should it be desirable to do so.

In addition to the charges for labor and supplies we have the fixed charges. Taxes being the principal item, it is necessary that we should charge a proportion each month. It being usually a large item, the effect on the cost sheet would be too great were it charged in total on the annual sheet. The proper way to handle this account is to charge off the taxes of the current year and not those of the past year, as has been done at some of the mines. This should be done by journal entry and appear on the trial balance as an account payable. Insurance should be handled in the same manner. While the effect is not so great, it is, nevertheless, very desirable, for close figures, to charge the expense on the basis of monthly proportions. In fact, this rule should apply as much as possible on all items of fixed charges.

This is equally true in the depreciation accounts. While it may be desirable to carry an item of construction through several years, it is far more satisfactory to charge off a stipulated amount each month. It gives a more uniform cost sheet, and we do not have to anticipate these charges when making estimates of cost during the year.

We must not overlook the most important item in connection with the cost sheet, viz., the product. It was the custom some time ago to figure the output so as to insure a very generous overrun when the stockpiles were cleaned up. I am not sure but that this custom still prevails at some of the mines, the idea being that the excess would pay for the loading, and offset the expense of taxes or some other item not shown on the monthly cost sheet.

I appreciate the feeling of satisfaction to the operating department when after the stockpiles are cleaned up they find a large overrun, which, when added to the product for the month gives them a cost per ton of 20 to 25 per cent below the cost for the previous month which was not effected by any such condition. (When there is any excess from the stockpiles it should be added to the product for the year and not for any one month. In this way we maintain more uniform conditions in the monthly cost sheet.) If we consider the result under the conditions just mentioned, of what value are our cost sheets for the information and guidance of the operating department? Should the cost for any month be above the average the operating department finds solace in the thought that to figure in the overrun on the product and the profit in the supply accounts "will bring the cost down about right."

It is clearly apparent that this system is far from satisfactory to the progressive manager, who realizes that in the days of sharp competition and very low prices he must know at the end of each month just what the ore is costing to enable him to make sales at a figure which will insure him some return on his investment when the annual balance sheet is drawn off. This can only be done by figuring the product as near as possible to the actual weight per skip, and the supplies at the actual cost, as well as the other charges mentioned, and in this way the cost sheet for each month gives him reliable figures upon which he can base the price for the ore on board cars at the mine.

We have now taken up the method of handling the items that enter into the cost sheet, and will review the arrangement of the accounts.

The first consideration in the list and arrangement of accounts for the cost sheet must be with the view of separating the items of cost and grouping them in such a manner that the expenditure will be clearly shown and the increase and decrease readily noted. In comparing the cost sheet with the previous month it is not sufficient to compare the cost per ton alone, but the cost in dollars and cents is the most important. As in the first case, an increased output may show a decreased cost per ton, while in reality the expense may be higher in some departments than for the previous month, and were the comparison not made in dollars and cents the fact may pass unnoticed and the cause of the increased cost not be investigated. To enable a close comparison of the cost for each account, it is necessary to distinguish between the operating and repair expense of the account, and in this way the increase and decrease of cost is very readily located.

A very convenient arrangement of accounts is to group them under the following headings:

1. General expense.—Insurance, taxes, engineering, analysis, and office expenses.

2. Maintenance. — General surface expense, repairs to buildings, machinery, trestles, cars, etc.

3. Mining expense.—The general items of mining cost, breaking ore, sinking, drifting, timbering, etc., to represent the cost of underground work, hoisting and pumping being also included.

A total of the three general accounts, as above, shows the producing cost, including, however, only the regular cost accounts. The extraordinary expenditures are shown below this total line and include exploratory and depreciation accounts as follows:

4. Exploratory.—Exploring in mine—diamond drilling. Exploring outside—test-pitting and diamond drilling.

5. Depreciation.—Inventory, improvement, new construction.

By drawing a total to this point, which includes the five general accounts, we find the cost of the ore on the stockpile, when stocking; or in the pockets, when loading direct into cars. To this total must then be charged the cost of loading and shipping on the basis of the tonnage loaded by steam shovel, by hand, or at the pocket, together with any other expense in connection with shipping, including stockpile bosses and ore sorters. In arranging the accounts of loading and shipping in this manner, we find the cost per ton on board cars will represent the actual cost by the different methods of loading; thus if we load one-third of the output from the pocket, one-third by steam shovel, and one-third by hand, we get the exact cost for each on board cars at the mine.

The arrangement of the detail cost accounts under the respective headings, as before mentioned, is a matter of the greatest importance and should be classified so that the cost of the various operations in the process of mining are clearly defined, and by which any changes in the method of working would be apparent, and the effect shown either as an increase or decrease in the cost of that particular operation. After we ascertain the cost of the ore on board cars at the mine we should add to this figure an arbitrary charge for selling expenses and insurance, and thus go one step further in the cost of mining and marketing our product.

To present the figures in this manner requires that the line be closely drawn between maintenance and operating expenses, in order to show whether the changes in cost are due

* Read at the Ironwood meeting of the Lake Superior Mining Institute Aug. 16-18, 1898.

to repairs or operating, and to bring clearly before the manager this fact, which might suggest to him some modification in the system of working or in the plant. If a separate account were not kept and the repairs and operating charged in one account the fact would not be as apparent, unless an itemized statement was made, which is not as satisfactory as having the account on the general books where you can get the figures not only for one month or one year, but for several years, without having to go back and pick them out from the general charges.

To my mind the system of detail, on about the lines here given, is of the greatest assistance to the mine manager, as it brings before him the figures of cost in a manner that would aid him to locate readily the increase or decrease in cost of one month with another or one mine with another and to show the effect of any changes he may have made in the plant, the method of working, or the class of material used.

In addition to the cost sheet, there are other statements which render the manager material assistance. It must be borne in mind that the manager of to-day, working against the sharp competition in the iron market, fully appreciates the assistance rendered him by the accounting department in preparing reports of cost of operating his mine—the product per man, the wages of contractors, the consumption of material, the cost of construction work and various other items about the mine. While he is thoroughly familiar with the expenditure and the results obtained, nevertheless, to present them on monthly and annual reports will be found of the utmost importance and convenience in keeping the figures before him for future reference. It will not be necessary, where a system of accounts as here mentioned is used, to wait until the 13th statement is made up in order to get the exact figures of cost for the year.

I might add that the principle that governs the successful manufacturing establishment, of not only keeping the cost of each article made, but the cost of each operation on the individual piece that enters into the construction of the finished article, should govern as far as possible in the system of mine accounts.

Before concluding let me say that I think it would be found most desirable and prove an advantage to all interested if a uniform system of mine accounts could be established; also a uniform cost sheet and wages statement. The latter could be exchanged between the different companies, should it be thought advisable to do so, as a matter of general information.

I know it will be thought by many an injudicious thing to establish a new basis throughout, and in that way lose the benefit of comparisons with their previous cost sheets. However, I think the subject important enough to bring before this meeting and believe that if the idea was carefully considered it would certainly meet with favor from some of the larger companies, especially those operating several mines, and am sure that if their system was once placed on a basis about as outlined in this paper the result would prove most satisfactory. I should be pleased to hear read at our next annual meeting a paper on this subject from some one connected with the office of a mining company, where a different system is in force. I think in this way we could gather considerable information on the subject of mine accounts.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Monessen Steel Co. has been organized by a number of Pittsburg capitalists, and will establish a plant at Monessen, Pa.

Darlington Machine Works, Darlington, S. C., are in the market for foundry fixtures.

The Sheffield Rolling Mill Co., Sheffield, Ala., is inquiring for second-hand machines for roll-pointing railroad spikes.

J. E. Rhoads & Sons, Third and Orange sts., Wilmington, Del., are in the market for a good second-hand stationary engine, with automatic cut-off and 25 h. p.

The Southern Iron & Steel Works, Birmingham, Ala., will buy a double punch and shear; also a set of bending rolls.

Middlesboro Foundry & Machine Co., Middlesboro, Ky., is in the market for one 24-inch lathe, second-hand; one special lathe for turning mining-car axles, one second-hand punch for punching three-quarter-inch holes, one second-hand bolt cutter.

The Stillmore Air Line Railway, Stillmore, Ga., is in the market for a second-hand wheel press taking in 36-inch wheels.

The Washington Tool Co. has been formed at Owatonna, Minn., for the manufacture of patent combination pincers and other tools, formerly made at Washington, Pa. The parts will be forged with drop and trip hammers. The officers are G. B. Hosfield, president; George Hastings, vice-president; S. E. Ware, secretary and treasurer and O. N. Nelson manager.

The Albany Foundry Co., Albany, N. Y., has been incorporated with a capital of $50,000, and will take over the old Perry stove foundry plant near that city. The company will manufacture iron and other metal castings.

The Aurora, Ill., board of public works will open bids for two boilers and a boilerhouse, Sept. 16.

At Philadelphia, the Genty Gear & Wheel Co., has filed articles of incorporation.

The Merrill Process Steel Co., St. Louis, has been incorporated with $100,000 capital, to produce steel by the Merrill process. G. Spencer Merrill holds 996 shares of stock and J. W. Evans, W. F. Carter, A. N. Sager and Geo. G. Pollard, one share each.

The Anglo-American Steel Co., Sheffield, Ala., has been incorporated by James T. Burns and others, at $1,000,000.

The Pittsburg Sheet Mfg. Co., Pittsburg, has applied for a charter. The names given are R. A. Wilson, Wm. Shoof, J. S. Knight, L. L. Woodward, Edwin Marshall and E. E. Hicks.

New Construction:—

Fraser & Chalmers will at once commence the construction of the buildings to complete their plant at 12th st. and Washtenaw ave., Chicago. The principal building to be erected is the machine and erecting shop. It will cover an area of 320x105 feet, and will be constructed of steel framework with walls of brick and roof of tile. Its cost will be $75,000. The perforating buildings will be one story, 60x100 feet, and will be of brick with steel trusses. It will cost $7,000. The tool and stock room will be one story, 175x50 feet, and will be of brick, stone and iron. Its cost will be $5,500. A shipping room, one story, 57x175 feet, will cost $7,000. An office, one story, 175x50 feet, will also be built, at a cost of $14,000. The total expenditure will amount to $101,500.

The Peoria (Ill.) Cordage Co. will erect a warehouse and machine shop. The latter will be 28x40 feet in size.

The Leechburg Foundry & Machine Co., of Pittsburg, with works at Leechburg, Pa., has commenced the erection of its large new plant at Homestead.

It is stated that J. B. Strawbridge, formerly with the Pittsburg Tin Plate Works, at New Kensington, Pa., will erect a plant at Leechburg, Pa., to make high grade charcoal terne plate and special grades of sheet iron.

The Pittsburg Bridge Co., Pittsburg, of which Mr. Albert Price is superintendent, has added to its shop equipment a No. 5 Hilles & Jones combined machine for heavy punching, coping and framing beams and channels. The company has received a contract, through Mr. E. H. Connor, Fullerton Bldg., St. Louis, western agent, to build for the Central Lead Co. a steel head frame and tipple for its Theodora shaft at Flat River, Mo.

The new shops of the Chicago Great Western Railroad, at Oelwein, Ia., will be fitted with electrical equipment, and belts and line shafting will be done away with. About 800 men will be taken from the present shops at St. Paul when the new plant is finished.

Work has begun on a new foundry building 40x80, for the Union Iron Works, at Bangor, Me.

Robert Wetherill & Co., Chester, Pa., have given to Alvah R. Kerr Co., the contract for their new foundry, 146x65 ft.

The Alabama Steel & Shipbuilding Co. is now ready to receive bids for the erection of its machine shop and foundry. Plans and specifications are furnished from the office at Ensley, Ala.

The Schoen Pressed Steel Co., Pittsburg, is erecting a three-story machine and pattern shop and a one-story blacksmith shop, both of brick.

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Ever notice the color, or apparent color effect, of a jet of steam issuing from a pet cock in a live steam main? Was it whitish? That was due to entrained moisture. The bluish color, or perfect transparency, is present only when the steam is dry.

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ALSO MANUFACTURERS OF THE
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Work is well along on the new rod mill at Ashland, Ky., and operations will begin about Nov. 1.

The projectors of the American Needle Co. are figuring with both Cleveland and Pittsburg capitalists. At a recent meeting it was decided that a tariff must be imposed on needles before manufacturing could begin. A question to be decided is whether or not the Eugene Fountaine machines shall be manufactured. It is stated that the company will be in position to supply the entire trade of the United States.

The Cyclone Woven Fence Co., it is reported, contemplates locating its Western works in Waukegan, Ill.

The Arcade File Works are reported to be considering the erection of a plow and skate factory in Alexandria, Ind.

Additions, Enlargements, Removals, Etc.:—

At Greenwood, Miss., H. G. Kitchell has added a foundry to his plant.

Work on the addition to the New York Air Brake Co.'s plant, Watertown, N. Y., will begin at once. The addition is for foundry purposes.

The Gisholt Machine Co., Madison, Wis., contemplates the erection of a new factory. A power plant of 100 h. p. will be installed, but it is not decided whether or not electricity will be used.

The plant of the Fort Pitt Bridge Co., at Canonsburg, Pa., will be considerably enlarged. The concern is full of orders.

The Midland Steel Co., Muncie, Ind., will build another addition, an iron building 100x300 feet, to contain annealing furnaces and several stands of rolls.

The Pittsburg Locomotive Works are adding two stories to their pattern shop, at a cost of $6,500.

It is proposed to remove the Wright Shovel Works from Greenfield to Alexandria, Ind.

A. Adamson, machinist, Akron, O., recently added a foundry 50x100 feet, enabling him to furnish iron and brass castings for every purpose on short notice. Mr. Adamson manufactures rubber working machinery, pottery machinery, and special machinery, and devotes particular attention to bicycle tire molds, die sinking and molds and dies for soft and hard rubber goods.

Fires and Accidents:—

The Kelly Foundry, Texarkana, Tex., had a $2,500 fire loss.

At Niagara Falls, N. Y., the Niagara Engineering Works were destroyed by fire Aug. 27. The loss is $20,000, and is nearly covered by insurance.

The Chicago Belting Co., 67 and 69 Canal st., Chicago, suffered a loss of $30,000 by a fire in its building on Aug. 16.

The Geisel Mfg. Co.'s plant at St. Louis, manufacturing japanned ware and tinner's supplies, was destroyed by fire; loss $175,000, partly insured.

Fire at the Crawford Steam Engine Works, at Duluth, Minn., Aug. 24, did $4,000 damage, patterns being the chief loss.

General Industrial Notes:—

The Alabama Rolling Mill Co., Birmingham, Ala., writes us that there is no foundation for the report that it will erect a steel mill.

The Middlesborough (Ky.) Foundry & Machine Co. has been organized to succeed the Crowe Foundry & Machine Works. The shops of the old Holliday Stove Works are being overhauled and repaired to begin operations. An additional foundry room will be built, and a 10-ton traveling crane put in. Other new machinery will be put in at once. Among those interested are Manager C. P. Perin, of the Watts Steel & Iron Syndicate, and W. H. and A. O. Crowe, of the Crowe Foundry & Machine Works.

The Ingersoll-Sergeant Drill Co., of New York, has just completed the installation of an air compressor in the works of the Lassig Bridge & Iron Works, of Chicago. This is a duplex Corliss compressor with steam cylinders 20x30 and air cylinders 30¼ and 18¼x30. The compressor is to be used for running riveters, hammers, hoists, etc. The entire plant of

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The A B C of Iron, Now $1.

this company is driven either by electricity or air, no line shafting being used.

The Laughlin Nail Co., Martin's Ferry, O., manufacturer of tin and terne plate, is now operating 14 mills to full capacity.

A meeting of the stockholders of the Buhl Steel Co., of Sharon, Pa., will be held at that place, on Thursday, Oct. 27, to take action on a proposed issue of bonds to the amount of $250,000.

The American Steel Casting Co., Sharon Pa., is making driving wheels for 150 locomotives. This concern is very busy at its Sharon works, and has orders ahead for several months.

The McKenna Steel Working Co.'s new rail mill, at Kansas City, Mo., is now working double turn renewing worn steel rails. It is expected that the output will be 350 to 400 tons a day when everything works smoothly.

The Cling-Surface Mfg. Co., of Buffalo, N. Y., states that the DeLemar Nevada Gold Mining Co., DeLemar, Nev., was so well pleased with the results derived from three barrels of Cling-Surface belt dressing received early in August, that on Aug. 20 it placed a duplicate order for three barrels more. Six barrels in two months from one concern is considered by the company a very good order, and substantial testimony to the efficiency of its dressing. The Cling-Surface Co. is behind in its orders, of which it has a large number on hand from all parts of the country, and the company reports that its business in the past month was the largest in its history.

The Brown Hoisting & Conveying Machine Co., of Cleveland, has taken contracts for three 10-ton electric pillar cranes with 16-feet radius and the Weston safety lowering device, to be installed at the Key West Navy Yard. This is a portion of the large Government contract secured by the Brown company some time ago, but there was delay on some of the subcontracts. The company also has contracts for a locomotive yard crane and a 50-ton traveling crane for the open-hearth building of the Alabama Steel & Ship Building Co., near Birmingham, Ala. The former is one of the company's steam cranes of the standard type and is designed for handling general material. The 50-ton crane is an electric traveler, and power will be furnished by five motors. It is designed for the handling of hot metal and ingots. There is a 50-ton trolley on the top girders and a 15-ton trolley between the girders and underneath.

The Anchor Nail & Iron Works, formerly operated on the South Side, Pittsburg, are making preparations to resume business. A new company will be chartered and a number of new stockholders have been taken into the concern, including Walter Chess, Charles Hollis, Harvey B. Chess, T. P. Hollis and O. H. Bateman.

The Terre Haute Car & Mfg. Co., Terre Haute, Ind., has 800 men on its pay rolls, more than at any time since 1893. Several good contracts are on hand and 20 cars a day are turned out.

Ore shipments from the Tilly Foster and from Lake Superior mines are being made to the Lackawanna Iron & Steel Co., preparatory to the starting up of one furnace that has been out of late.

The following board of directors has been elected by the Scranton (Pa.) Forging Co., C. H. Welles succeeding Wm. T. Smith: C. H. Pond, Henry Belin, Jr., W. R. Storrs, I. F. Everhart, Hon. William Connell, J. M. Kemmerer and C. H. Welles.

Alice Furnace, at Sharpsville, Pa., resumed Aug. 31, after being out for two months, during which repairs were made.

The King, Gilbert & Warner Co., Columbus, O., has bought 15 acres of land. Contracts have been let for the new rod mill of the company.

A Boston special says: "Washburn & Moen Mfg. Co. stock which has been paying $8 per share per annum and selling around 125, is now 148 and 150. It is understood that the Wire Trust offered this company $150 per share, but the company declined to come in at less than $200 per share."

Two new heating furnaces, 7½x15 feet, which are to be fired with coal and attached to which are two Cook waste heat boilers of 150 h. p. each, are being put in at the Belmont mills of the Wheeling Steel & Iron Co. The engine is the MacIntosh-Hemphill slide valve pattern with cylinder 28x38 inches, driving direct the 16 inch mill, which consists of one stand of three high rolls. These rolls rough the iron, which is finished on a 12 inch mill. It is the intention to make skelp up to 8 inches in width on this mill. The mills are all completed waiting the rolls, and it is the intention to start the mills the 15th of September. All alterations in the building have been

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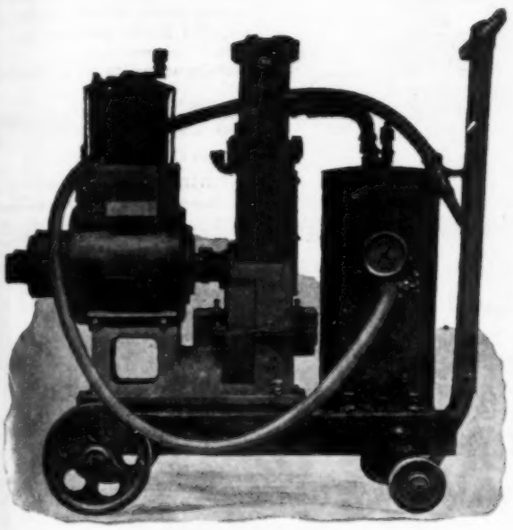

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completed except the shields for the boilers. The mills when in running order will turn out about 100 tons of skelp a day. As soon as they are in running order the old skelp mills will be torn out and the two mills at Brilliant, together with the 36x48-inch engine will replace them.

The Pittsburg Reduction Co., of New Kensington, Pa., has just received an order for 50,000 pounds of aluminum for the Russian government, for army equipment.

The Leechburg Foundry & Machine Co., Pittsburg, has just started the first of its gear-molding machines. It will mold gears up to 60 inches in diameter, while the second machine, which is now being built, will mold up to 144 inches in diameter. The teeth are almost as exact as in cut gears, the principal difference being that the surface of the iron is different.

The bar mills at Frankton, Ind., of the Northwestern Iron & Metal Co., of Chicago, have shut down for repairs, after running for nearly two years steadily. Another heating furnace will be built for the 8-inch train, and another busheling furnace will be added. The improvements will increase the capacity 25 per cent.

It is stated that J. B. Strawbridge, formerly with the Pittsburg Tin Plate Works, at New Kensington, Pa., will erect a plant at Leechburg, Pa., to make high grade charcoal terne plate and special grades of sheet iron.

The stockholders of the Jefferson Iron Works, Steubenville, O., are making an effort to take that concern out of receiver's hands. The blast furnace is being operated under lease by the Aetna-Standard Iron & Steel Co., of Bridgeport, O.

The Shoenberger Steel Co. and Laughlins & Co., Ltd., of Pittsburg, will erect mixers for hot metal. That of the Shoenberger Co. will be of steel plate and capable of holding 250 tons of hot metal. It will be lined with furnace brick and will be so balanced on a trunnion that it can be tipped like a converter. It will be so located that 25-ton ladles will be carried to it by an electric crane from the blast furnace. The mixer of Laughlins & Co. will be capable of holding from 400 to 500 tons of hot metal. It will be located on the South Side, and the hot metal will be carried in tank cars, holding 20 tons each, over the Monongahela connecting railroad bridge. Over 40 cars will be operated between the Eliza Furnaces on the north side of the river and the mixer on the other side.

The following distribution to Minnesota Iron Co. stockholders is said to be agreed upon in connection with the organization of the Federal Steel Co.: First 1½ per cent cash dividend; second for every $10,000 par value of stock the holder will get $13,600 par value of new preferred stock and the privilege also of subscribing for $10,000 of new common stock at 25. It is calculated that the new preferred stock on a very conservative basis is worth at least 85, while the new common stock is worth at least 40. On this basis the present Minnesota Iron stock, it is calculated, would be worth at least 125.

General Manager Schuler, of the American Steel & Wire Co., in an ultimatum to the strikers at the American mill, Cleveland, said last week: "We are going to run this mill and we are going to run it full before long. The jobs are there if the old men want them, and if they do not they must stand aside and see others take their places. The American Steel & Wire Co. is paying more than its competitors for drawing wire and the scale will remain as it is. We will not compromise. We will not receive a committee of the strikers, neither will we submit to arbitration."

The Gracey-Woodward Iron Co.'s property in Clarksville and Dickson counties, Tenn., was recently sold at auction under a mortgage held by Milton H. Smith, president of the Louisville & Nashville Railroad Co. The property consists of mineral lands, mining rights, machinery, etc. It was purchased by the Louisville (Ky.) Property Co., for $16,060.

The Hudson (N. Y.) Iron Co. has wound up its affairs, and Mr. Frank H. Stott, the vice-president, has been appointed receiver by the court. The company was organized in 1848, with a capital stock of $175,000, which was subsequently increased to $375,375, representing 3,753¾ shares at $100 par value. Up to 1873 large dividends were paid by the company.

The Bass Foundry & Machine Co., Ft. Wayne, Ind., filed a $1,200,000 mortgage in favor of the Continental Trust Co., of New York.

Arrangements are being made to put Joanna Furnace, in

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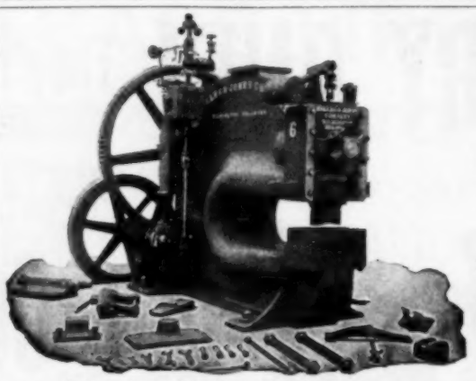

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the southern part of Berks county, Pa., in blast early in the fall. There is considerable material on hand. The furnace has not been operated for several years.

The Lane & Bodley Co., Cincinnati, is working full time with a force increased to nearly 400 men. The company's business in the first four months of 1898 was $100,000 more than in the corresponding months of 1897 and has since increased steadily. Counting in the Cincinnati water works contract, the increase from Jan. 1 to May 1 over the same period in 1897 would be $500,000.

The Buhl Steel Co., Sharon, Pa., will make some additional expenditures with part of the proceeds of its proposed $250,000 bond issue. By the resignation of Frank H. Buhl as president and from the directory, the board consists of Warner Arms, president: David Adams, treasurer; Arthur Buhl, secretary; Theo. Buhl, G. A. Baird, T. J. Forker and Nevin McConnell. Some fundamental changes may be made in the plant.

The Hilles & Jones Co., Wilmington, Del., has completed an immense machine for the Harlan & Hollingsworth Co. This was a set of special bending and flanging rolls, 20 feet 6 inches between housings; top roll, 23 inches in diameter; bottom rolls, 20 inches diameter, driven by duplex engines. Weight about 150,000 lbs. It will be used to roll and bend iron and steel plates for the hulls of vessels.

The Laidlaw-Dunn Gordon Co., Cincinnati, report orders for $200,000 worth of machines on their books, on which they have not yet started work, and note a good improvement in orders from domestic sources, with a continuation of an excellent foreign business. Among recent orders are a 6,000,000-gallon pumping engine for the Lebanon Furnace Co., Lebanon, Pa.; two large high pressure engines for the South Chicago works of the Illinois Steel Co. The company also reports a good run of orders for air compressors from the South.

The Scottdale Iron & Steel Co., Ltd., is adding a galvanizing department to its plant at Scottdale, Pa. The new building will be 60x153 feet. Improved machinery and appliances will be used.

There is a prospect that the Valentine Iron Works, Bellefonte, Pa., will be operated again. A considerable outlay must be made for new equipment.

The Carpenter Steel Co., Reading, Pa., made the largest shipments in its history in August, about $300,000 worth of projectiles.

There are now in blast 30 of the Semet-Solvay ovens at Ensley, Ala., and the number wil be increased steadily.

Eagle mill, at Ironton, O., is running full, making the largest output in its history.

The first heats of the one active furnace out of seven at the Watts steel plant at Middlesborough, Ky., were entirely successful and excellent steel was made. Another furnace will soon be ready.

Dunbar Furnace, Dunbar, Pa., after being shut down for three months, started up last week.

There is some prospect of putting Etna Furnace at Ironton, O., in blast.

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Thursday, September 8th, account of Elks' Day at Canton Street Carnival. Tickets good going and returning date of sale only.